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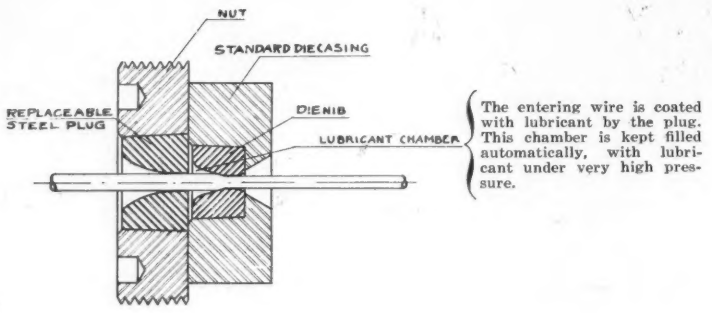
January 1932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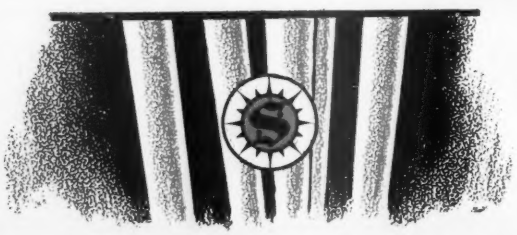

WIRE & WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip. Wire Products and Insulated Wire and Cable.

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING.

Vol. 7 January 1932 No. 1

Official Publication of The Wire Association

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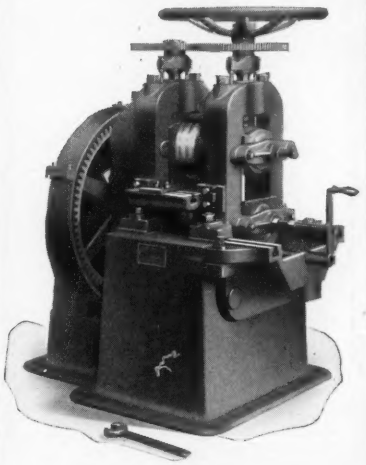

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DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 7 JANUARY, 1932 No. 1

Effect of Quenching Temperature on the Physical Properties of KA2S Rod

By John L. Everhart

AMONG the the stainless ferrous alloys which are becoming increasingly popular in industry, the alloy known as 18-8 is finding wide application. It is being used for purposes ranging from the purely ornamental, such as the metallic covering of the roof of the Chrysler Building in New York City, to the purely utilitarian, such as tubing for the handling of corrosive liquids in the chemical industries.

✦ ✦ ✦

THERE are several modifications of this alloy which are designated commercially at KA2, KA2S, etc. KA2S is the modification containing less than 0.07% carbon, from 16.5 to 20% chromium and from 7 to 10.5% nickel.

✦ ✦ ✦

BECAUSE of the high chromium and nickel content, this alloy is austenitic under normal conditions. That is, the material is composed of gamma iron containing the alloying elements in solid solution. Under the microscope, KA2S shows the single phase crystal structure which is common to many of the non-ferrous alloys.

KA2S is not hardenable by heat treatment. However mechanical working causes an increase in the tensile strength and the so-called "yield point" with a decrease in ductility, the degree of increase in strength being dependent on the severity of the working. Apparently there is, at the same time, a precipitation of carbides throughout the crystal usually along slip planes which are favorably situated with respect to the direction of working.

Results of Tests to Determine Effect of Quenching Temperature on Strength and Ductility of Rod ▼ ▼ ▼ ▼ ▼ ▼

✦ ✦ ✦

IN common with the other austenitic alloys, KA2S is restored to its softest and most ductile form by heating to a temperature sufficiently high to cause the release of strains and the re-solution of the carbides followed either by quenching in water or cooling rapidly in air. This operation restores the material to the original single phase solid solution. Because of the sluggishness of alloys of this type, relatively high temperatures are required for the heat treating operation. The lowest temperature for the successful treatment of KA2S is in the neighborhood of 1800° F. As the quenching temperature is increased, the grain size of the material increases rapidly. In addition, long heating at the treating temperature is accompanied by increased grain size. Consequently, in order to retain a suitable grain structure, the best results are obtained by heating slowly up to about 1600°F. and then heating rapidly to the quenching temperature, keeping the material in the furnace only long enough to assume uniform heating.

✦ ✦ ✦

IN order to determine the effect of increasing the quenching temperature on the physical properties, a series of tests was run on KA2S rod.

✦ ✦ ✦

Material

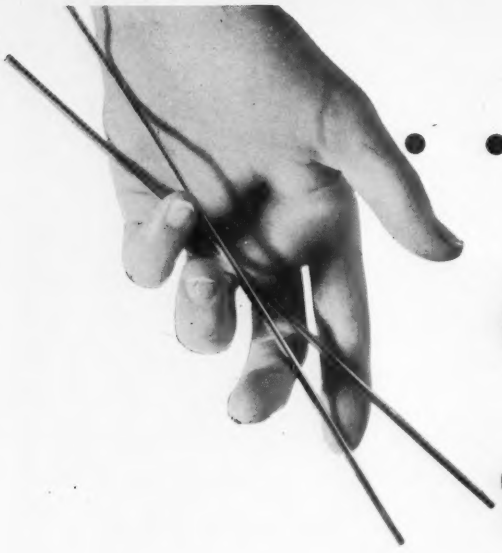
THE material as obtained from the mill was in the form of a hot-finished, i. e. air cooled from the finishing temperature, 1″ round rolled rod.

The analysis was:

Carbon	0.065%
Silicon	0.54
Chromium	16.96
Nickel	8.93

✦ ✦ ✦

PHYSICAL properties determined on Standard A. S. T. M. 0.505″ diameter by 2″ gage length



. . . but they are *Not* the same

A COMPANY* purchased two 500,000-pound lots of .45 carbon steel wire for conversion into road mats for re-enforcing concrete roads. Allowable wire size .194/.190. One lot was drawn through chilled iron dies, the other through Carboloy dies.

OPERATING DATA

The average weight of each bundle of wire drawn was..... 375 pounds

CHILLED IRON DIES:

On the first lot, using chilled iron dies, one bundle per hole was obtained. To complete the lot required..... 1333 holes

The front end of each bundle was on size and the tail end at or close to the large size allowed. Based on the mean size of .192, weighing 99 pounds per 1000 feet, they obtained, from 500,000 pounds.... 5,050,000 feet

THE CARBOLOY DIE:

On the second lot, using a Carboloy die, no hole changes were made.

Starting at the low size of .190, the average wire size was .191, weighing 98 pounds per 1000 feet and furnishing..... 5,100,000 feet

The Carboloy die saved 1332 hole changes, made longer bundles, with a total increase of 50,000 feet of wire (9.5) miles weighing 4900 pounds, and *gave a better finish to the wire.*

These are a few reasons why the phrase: "To be drawn through Carboloy cemented carbide dies" is becoming mighty popular among wire buyers these days.

*Name on request.

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3. Superior surface finish.
4. Longer life per hole size.
5. Less rejections, less scrap and a more economical product.

specimens prepared from this material as received were:

Hardness Rockwell	B-110
Yield Point lbs/ sq. in.	52,000
Tensile Strength lbs/ sq. in.	105,000
Elongation % (2")	47.0
Red of Area %	70.0

Although a figure is given for "yield point", there is no yield point with KA2S of the kind obtained by a drop of the beam with carbon steels, as the material yields by a series of slips. Therefore, the so-called "yield point" is determined by the use of dividers or with an extensometer.

✦ ✦ ✦

Heat Treatment

SAMPLES of the material were rough-turned to approximately the diameter of a standard A. S. T. M. round test specimen and treated as follows:—Two specimens were heated in a furnace which was maintained at 1850°F for ½ hour. At the end of this period they were quenched in cold water. This operation was repeated with two specimens at eachof the following temperatures, 1950°F., 2050°F., 2150°F., and 2300°F.

After treatment, the samples were finished by machining to the standard dimensions, i. e. 0.505" diameter by 2" gage length.

✦ ✦ ✦

Tensile Test

THE specimens were broken in a universal testing machine, the "yield point" being determined by dividers. The results obtained on the two samples tested for each quenching temperature were averaged and the results are shown in the table.

These results indicate that there is a rise in strength with a corresponding decrease in ductility, as measured by the elongation and reduction of area, up to 2050°F. Between 2050°F. and 2300°F. the strength falls off rapidly and the ductility rises to approximately the value obtained on the material quenched from 1850°F.

These tests indicate that the best quenching temperature for KA2S to obtain a combination of strength and ductility is below 2050°F.

Quenching Temp	Hardness Rockwell	Yield Point lbs. sq. in.	Tensile Strength lbs. sq. in.	Elon. % (2")	R. of A %
1850°F	B-74	28,000	94,000	62	75
1950	B-78	29,500	95,000	60	72
2050	B-78	30,000	96,000	58	71
2150	B-73	27,000	89,500	62	68
2300	B-70	25,500	84,000	66	72

Comparison

A comparison of the values obtained for heat treated material with those obtained on the original hot finished material shows the very marked effect which mechanical working of KA2S has on the physical properties.

✦ ✦ ✦

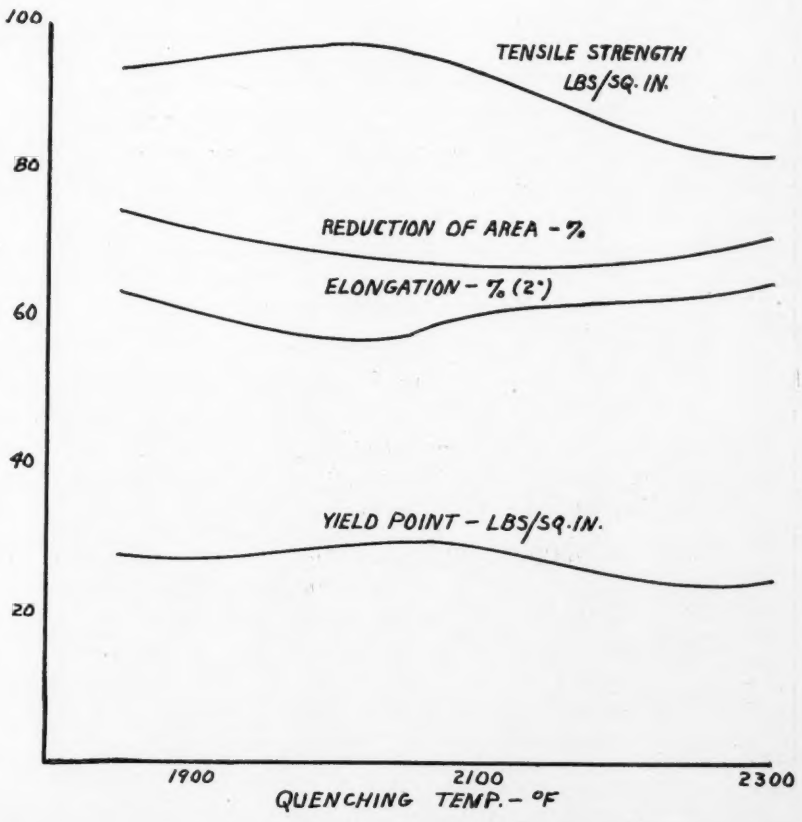
Grain Size

SPECIMENS for microscopic examination were cut from the heat treated specimens. Examination shows that there is a very great increase in grain size with increasing temperature, particularly above 2050°F. In deep-etched samples, the grain size could be seen readily, without magnification, in the samples quenched from 2150°F. and 2300°F.

✦ ✦ ✦

Conclusions

THE results obtained in this series of tests indicate that, although the heat treatment of the austenitic alloys is a very simple process as compared with that of some of the other alloys, the quenching temperature is a very important factor in obtaining suitable physical properties and grain size.



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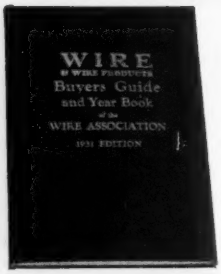

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History of the Wire Industry

Part II

By Kenneth B. Lewis

Wire Mill Engineer, Morgan Construction Co., Worcester, Mass.

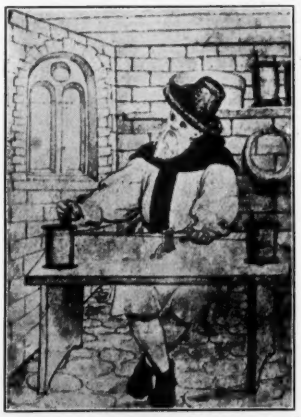
A description of the Development of Wire Drawing and Its Processes Presented Before the 1931 Meeting of the Wire Association. ▼ ▼ ▼ ▼ ▼ ▼

Rod Production

ABOUT the time of the early settlement of America, rods of iron were being produced both by hammering and by a slitting mill and were cleaned by hand. They were drawn in straight pieces down to 15 or 16 gauge the weight ranging from 2 to 7 pounds. The number of drafts was 5 to 6 times our present practice for the same reduction, and annealing was done about every three drafts. Fine wire was drawn on blocks, one block per man, and the block was turned by a hand crank mounted either on the edge of the block or on the top of its spindle. (Fig. 5) About 1670, the fine wire blocks began to be hooked up to water power but hand operation persisted for 150 years longer. The regular organized wire mills drew coarse wire only, and sold it at about 16 gauge as a semi-product to individual wire drawers who finished it on hand blocks in their homes. In 1734 the most advanced practice was to get the wire onto blocks at 14 gauge. These were power driven blocks to some extent but 14 gauge was well within the capacity of the hand driven block since the drafts were light, the blocks 12 or 13 inches in diameter and the cranks sometimes two and three times the block radius.

✦ ✦ ✦

THIS matter of getting wire onto blocks at as large a gauge as possible, was frequently discussed. Evidently a demand was growing up for finished product in larger sizes and the grip marks were getting troublesome. At about this time a very fast tilt hammer was brought out, one that would do about 200 blows a minute, driven by cams on a large water wheel shaft and rods in 10 or 12 foot lengths could be forged down to ¼". In 1728, a Frenchman by the name of Fleuer, made quite a stir in the wire industry. He seems to have been the first to make a study of layout for production and the first to make time studies and calculations. As a result of his studies he began to discuss the possibility of producing rods by rolling and in such length and diameter that they could go directly onto a bull block. This was a startling proposal. Mr. Fleuer was about three generations ahead of his time. No one listened to him. He did make some progress however. He forged a rod in the shape of a sharp oval and gave it four passes in a pair of grooved rolls to a 5/16" round. He pushed up the production of rods per man to ten times the best previous figure and his rod and wire operation was so successful that within a few years



Block for drawing fine wire.

✦ ✦ ✦

France, which had had no wire industry for fifty years, began to bother the neighboring countries with an exportable surplus. Mr. Fleuer had started something.

✦ ✦ ✦

IN 1769 an English patent was granted to a Mr. Ford, on a rod mill consisting of several stands coupled together and his application described the looping of the first end. There is no record of such a mill having been built. The orthodox wire mills were still relying on hammered bars and those who were more daring took a long chance on slit bars.

✦ ✦ ✦

IN 1828 we get the first modern note in rod production. Karsten describes at that time the existing practice of hammering and slitting, concedes that there has been some experiment in the direction of finishing in grooved rolls both hot and cold, concedes the advantage of the smooth and accurate product of a rolling mill and reproduces a drawing of what looks like a real rod mill. His picture shows a three-high roughing stand with rolls grooved to start a 1" square iron billet and a couple of alternate two-high finishing stands clearly intended for looping. The speed is stated to be 250 R. P. M. and the product a 5/16" rod rolled in seven pound bundles, coiled on a reel and taken to a bull block to be broken down in coils. The interesting thing about this mill is that it places three-high rolling 28 years ahead of the work of John Fritz at Cambria whom most of us have always regarded as the father of three-high rolling.

THE ATLANTIC WIRE CO.

MANUFACTURERS OF

IRON AND STEEL WIRE

BRANFORD, CONN.

JUN 25 1931

June 24, 1931.

Wire Association,
551 Fifth Avenue,
New York

Gentlemen: Attention: Mr. Richard E. Brown, Secretary.

This will acknowledge your letter of the 23rd requesting us to join the Wire Association.

We are very glad to join this Association and glad the same has been organized, for the industry needs something of this character which will prove of benefit to all those manufacturing and interested in the various grades of wire. We believe that the old type system of keeping things under lock and key when you conceived a new idea which works out to show economy and saving is a shortsighted policy, in other words, to try and keep these under cover to the extent that you reduce your costs and then allow your sales department to go out and cut prices in proportion to the saving effected.

This Company has always had an open policy and has always been willing to have other wire manufacturers visit our plant. If there are any ideas which we have which are of value and interest, they are entitled to the same, for if our sole object in business is simply to make money, it is a shortsighted policy to say the least; whereas if the wire manufacturers as a whole will cooperate and exchange ideas to the extent of reducing their costs with the idea of having these savings reflected in profits, we will have gone a long step forward in operating a wire industry to the benefit not only of the manufacturers, but of those who are purchasers of wire.

We believe that this depression which we are passing through should prove of benefit and if it teaches the lesson that price cutting is a losing game, it will be worth the cost and be the means of establishing a business basis where each manufacturer can conduct his business at a reasonable profit.

Yours very truly,

THE ATLANTIC WIRE COMPANY

Wm. E. Hotchkiss

WEH:K President

FOR INFORMATION REGARDING
THE WIRE ASSOCIATION
ADDRESS
Richard E. Brown, Secretary 551 5th Ave., New York, N. Y.

THESE rolled rods came into use very slowly but in 1832 there is a record of rods being rolled down to 9/32. In 1845 rolled rods were the standard raw material. The 1" square billet had grown to a length of 5 feet and the most advanced mills were doing 3,000 pounds a day of 5½ gauge in 17 pound bundles. The principles had been satisfactory worked out and progress between 1945 and 1860 was rapid and in 1862 the first continuous rod mill went into operation. The rapid development of the continuous mill was vastly aided by the development at this time of the bessemer and openhearth processes which gave the rod makers for the first time a metal that would stand heavy reductions and slight pulls between passes.

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Summary

THIS brings the wire drawing industry right up to date. Since rolled rods began to be cleaned in sulphuric acid, coated with lime and ripped on rotating blocks, there has been no fundamental change in wire drawing practice.

✦ ✦ ✦

THERE are many gaps in the history of wire. The origin of the die cannot safely be dated within 400 years; there is very scanty data about lubrication; the origin of the lime coat is wrapped in mystery and I wish we could get some news of earlier coatings which must have been tried and abandoned. The day the first rods were drawn on a rotating block was a big day in wire mill history but I can't date it safely within 50 years. The use of copper sulphate and wet drawing sprang up unnoticed by the historian. In 1830 a complete description of wire drawing entirely ignores wet drawing although illustrations show fine wire coming out of tubs. My guess is that copper sulphate came in between 1840 and 1850. It was well established by 1868 for at that time the discovery was made that the color of the copper coat could be modified by the use of tin.

WE have come far in the past thousand years but we still have far to go. Having stated at the beginning that history is the only sound basis for prophecy, I presume I am now expected to forecast the future. I do not feel at all shy about doing so, for if history is any guide I shall be dead long before I can be checked up.

✦ ✦ ✦

Future Possibilities

WE can't look for any radical change due to improvement in the raw material. There are some surface defects and some internal defects that will tend to die out as steel mill practice tightens up, but they play a small part in the tonnage wire mill. Die pulls are now pretty close to the breaking strain and since anything that increases tensile strength increases die pull in the same degree, I don't look for much in the way of heavier drafting. Still, I don't dare commit myself too far on this point. It may be that cleaner, sounder steel will draw in larger cone angles without going cuppy, and that therefore a smaller percentage of die pull will be chargeable to friction and a greater percentage available for actual deformation. In other words, we may be able to draft heavier. It may be that some new lubricant will reduce die friction. Tungsten carbide dies clearly have a lower coefficient of friction than steel or cast iron, and they may be further improved by a higher polish, or a denser structure, again permitting heavier drafts. It may be that some means will be found to control the size of crystals, and the alignment of their slip-planes. It is known that if a unit of metal can be induced to take the form of a single crystal, amazing things can be done with that crystal. I don't dare to say that the wire rod may not some day consist of a single crystal. One thing we can confidently expect is heavier bundles. Deacon Washburn says in his autobiography that in 1830 the daily output of a man on coarse wire was fifty pounds. It is now close to 20,000 pounds, a four hundred fold increase in one hundred years. It is significant that the unit length of wire rod has in the same period increased just four hundred fold.

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ANOTHER change may possibly take place; a change in the diameter of the rod. Number five was selected years ago as the point where the line was most economically drawn between hot rolling and cold drawing. At that time hot rolling had just taken its big forward step. Since then cold drawing has taken a few steps and may take more, and in spite of the fact tha a whole technique has grown up around the No. 5 rod, it may have to be rebuilt around another gauge. This gauge will probably be considerably coarser, possibly as much as 5/16, although this depends much on what the future has in store in the way of markets for the common products. About half the output of the common products mill is one and two-draft wire from No. 5 rod. From a 5/16 rod this would be three and four-draft wire. In single hole practice, the drawing cost varies almost directly with the number of drafts. In continuous drawing on the other hand, the number of drafts is of little consequence; the cost varies almost directly with the weight of the bundle. Wire from 6 to 9½ gauge, if three and four-holed from a coarse rod, would be stiffer and might, by permitting the use of smaller diameters, put some life into the nail market. A keg of nails of a certain length would contain 60 or 70 percent more nails by count. As for galvanizing, three and four-draft wire would be cleaner and easier to cover. As a raw material, the coarse rod would be more satisfactory; it would be easier and cheaper to clean, coat and bake, would take less acid and lime, be less susceptible to acid brittleness, and would run better off the flipper. It would take more power to draw but less to roll. Bundles could be of double weight out of the same length of billet. Wire drawing labor costs would be about the same, the cost of extra drafts being balanced by savings

(*Please turn to page 29*)

Wire Rope For Oil Well Pumping

By Percy R. Clark

Managing Director, Societatea Anonima Anglia, Ploestiatea, Roumania

A Description of the Advantages of Wire Rope in Oil Well Pumping, Showing Results of an Investigation Made in the Oil Fields of Roumania. ▼▼

Mr. Clark was formerly Managing Director of the Baku Wire Rope Cable Co., Ltd., and Ropeways (Russia) Ltd., and is an Associate Member of the Institution of Petroleum Technologists (England), Member of the Institute of Metals (England), Member of the Iron and Steel Institute (England), and Member of the Institution of Production Engincers (England).

WHEN I first saw oil well pumps at work, it occurred to me that there could be no reason why the pump should not do its work, and do it better, if operated by rope.

Surely the rope is a more convenient article. Rods have to be screwed on piece by piece on being lowered into the well, which operation has to be reversed when the rods are extracted; the rope is in one piece and can be lowered into, and raised out of, the well in a few minutes. Rods are made of iron or cast steel; the rope is made of high breaking strain cold drawn steel, the toughest form of steel that exists.

Nevertheless, Roumanian producers were not using wire ropes for pumping.

I got into conversation with many engineers, and was given to understand that rods were better for this work. However, strange to say, not one of these judges had ever pumped with a wire rope. When I did at last meet some petroleum engineers who had pumped with wire ropes, they had nothing but good to say about the rope.

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ALL this set me thinking still more deeply. Now it was obvious to me that the wire rope had many advantages in comparison with rods:

1). The wire rope is much lighter than a string of rods.

2). The wire rope is much cheaper than rods.

3). The material of which the rope is manufactured being hard cold drawn steel, viz, the toughest form of steel that exists, the rope must have more durability than sucker rods.

4). The wire rope being much lighter, much less motive power is required to work the pump, and there is correspondingly less wear and tear on the installation generally.

5). The wire rope, having no couplings to come unscrewed, can be worked at practically any speed one wishes. In fact there have been cases since when we have worked the wire rope at 32 strokes per minute, without the slightest inconvenience. I am told it is seldom possible to work with rods more than 20 or 25 strokes per minute. In fact some users are afraid to go at a higher speed than 15.

6). The wire rope can raise or lower the piston in a few minutes without any hand labor whatever. Rods require hours of hand labour for the extraction and return of the piston.

7). From the foregoing it is furthermore evident that there is considerable increase of production with wire rope pumping.

8). On the rope there are no couplings to damage the tubing, and by the adaption of rollers, which can be attached and detached from the wire line when and where it is required, the wire line will not touch the tubing even in crooked wells.

9). Rods have a habit of snapping unexpectedly without giving any warning. This the wire rope never does. The rupture of a wire rope commences by the severing of individual wires, and, when the wire rope has reached the end of its life, there comes the second stretch. This is detected at once, for the pump simply ceases to operate. Then is the time to replace the rope, but, by the way, that time has not yet come in a single instance in Roumania.

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I THEN thought I would endeavor to get some entirely unbiased information on the question, and to this end looked around for a pump manufacturer who did not manufacture rods, someone merely interested in seeing that the means for working his pump were the best.

I found such a manufacturer in the U. S. A. and wrote to him on this point.

This is what he replied:—

"Wire Line Pumping Outfits are more generally used throughout the Eastern Fields of the United States than in the Mid-Continent and Western Fields, but there is no reason why they should not be more generally used in the Mid-Continent and Western Fields, except THE VARIOUS ROD COMPANIES HAVE BEEN TRYING TO DISCOURAGE THEIR USE.

"Among the principal companies who use wire line pumping outfits are the United Fuel Gas Company, Virginian Gasoline and Oil Co., Ohio Fuel and Supply Company and the Manufacturers Light and Heat Company. The above companies are subsidiaries of the Columbia Corporation. The Hope Natural Gas Company, Hope Construction and Refining Company and the Carter Oil Company. These three are subsidiaries of the Standard Oil Company of New Jersey. South Penn Oil Company, the Pure Oil Company and the Ohio Oil Company.

"These are about all the major companies who operate in the Eastern fields. There are also a great many independent companies who also use wire line pumping outfits, but we do not believe that their names would means much to you.

"In the Louisiana-Arkansas district, the Arcansas Fuel Oil Company use wire line pumping outfits exclusively and from all reports of our representatives they are OPERATING THEIR WELLS AT A LOWER COST THAN OTHER COMPANIES WHO ARE USING RODS.

"We are enclosing a page taken from this month's issue of The Petroleum Engineer (March 1931) regarding the test of a wire line pumping outfit in the Seminole, Oklahoma field."

NOW, there are some very interesting points in this letter.

First, the statement that there was no reason why ropes should not be more generally used, except that the various rod companies had been trying to discourage their use.

A very good reason from the rod manufacturer's point of view, but hardly one that should guide the petroleum producer.

Secondly, there is an oil company operating their wells at a lower cost with ropes, than is the case with companies who use rods.

Now, what have we reached here?

On the one part, the only people who were speaking against the use of the wire rope for pumping were:—

1. The Rod Manufacturer.
2. Those Petroleum Engineers who had never used a pump rope.

In favour of the wire rope for pumping were:—

1. The Pump Manufacturer who does not manufacture rods.
2. The Petroleum Engineers who have been pumping wells with wire lines.

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THE first producing concern in the Roumanian Oil field, who got seriously to work trying out the pump rope was the **"Consortiul Petrolului"** who put a rope to work in their well No. 519, at Gropi, in August, 1930.

In connection, Mr. Muller, the late manager of that concern, wrote as follows:—

"We are using a wire line of 15 m/m. diameter, 650 metres long, working a 2" Axelson pump at a depth of 550 metres in our well No. 529, Gropi.

"This rope has been working almost without interruption since August, 1930, has never been broken, there has been no need to shorten it, and is today still in perfect condition."

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FURTHERMORE, Mr. Muller stated that through working a pump rope instead of rods, he had made a regular economy of about 66-2/3%. In other words, the exploitation of the well by means of a pump rope costs only 1/3 of what it did with rods.

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HOWEVER, I went on trying to ascertain the negative side as understood by my technical friends, who had theoretic ideas on this question. These objections could all be summarized in the following:

a. Excessive elongation of the rope.

b. Difficulty in extracting the piston from the well in the event of the well sanding up.

It therefore seemed that if one could overcome these two objections, the wire rope must be the perfect means for working the pump.

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THE question of constructing the rope which did not elongate was not easy, but this objective has been almost reached. The latest type of pump rope, i. e. ropes constructed specially for working the pump, do not give more than 0.1% elongation, which perhaps is not more than rods sometimes give.

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AS regards the theory about the rope getting sanded up in the well—that objection probably does not apply more to the rope than it does to rods.

First, if the well is such a sandy one, that sand is piling in all the time—it is no pumping proposition at all. If such a well cannot be worked with a compressor, it should be bailed.

However, there are cases in which the well owing to the smallness of the production, has to be left standing for a time, and during that period sand will gradually creep up.

Now, this is a danger when working with rods, for the rods cannot easily be pulled out, and the piston is consequently, in the case of rod pumping, invariably sanded into the well. But, on the contrary, with rope pumping this danger can be easily avoided. All that is needed, before leaving the well to stand, is to raise the piston a few feet, which is a matter of a few seconds, and then one runs no risk whatever.

These were the considerations that led me to push on with studying the application of the wire rope to oil well pumping.

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THE first pump rope, that was as already mentioned, introduced into a well in Roumania, was with the **Constortiul Petrolului Co.** on their Gropi plot.

The following are some details:

1. Well No. 519
   Depth: 1800 feet
   Diam. of tubes: 2"
   Make of pump: Axelson
   Stroke: 25 inches
   Strokes per minute: 20

This cable, which was first put to work in June, 1930, is working to-day. After a year of work, the rope broke near the socket, but was quickly resocketed again, and apparently the rope has many years of life before it.

It is evident that immediately above the socket at the beginning and end of each stroke a certain movement takes place in the wires of the rope, and it is natural that after a year of such work, which may mean something approaching 400,000 strokes, the rope may give at this spot.

The breakage is of little importance. It only means the reducing of the rope by two or three metres, and two or three hours of work to socket the rope again.

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IN October, 1930, the Sirius Co. (now Concordia) installed a pump rope in a well on their Gura Ocnitei plot.

2. Well No. 38
   Depth: 1700 feet
   Diam. of tubes: 2"
   Make of pump: D. & B.
   Stroke: 30"
   Strokes per minute: 21-22
   Production: About 2½ car loads daily

This rope is still working without interruption, and it is interesting to note that, as they were able to work the rope at a faster speed than they has been able to do with rods, the production has meen considerably increased.

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I GIVE below some details of other wells where pump ropes are working:

3. Oilfield: Runcu
   Depth: 1600 feet
   Diam. of tubes: 2"
   Make of pump: Emsco
   Stroke: 28"
   Strokes per minute: 22

4. Oilfield: Chiciura
Depth: 2100 feet
Diam. of tubes: 2″
Make of pump: Imperial
Stroke 28″
Strokes per minute: 21-32

5. Oilfield: Tontesti
Diam. of tubes: 2½″
Depth: 1740 feet
Make of pump: Lucey
Stroke: 20″
Strokes per minute: 16-18

6. Oilfield: Tontesti
Depth: 2050 feet
Diam. of tubes: 3″
Make of pump: Neco
Stroke: 32″
Strokes per minute: 14

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THE following are some of the difficulties that have been met in the application of the pump rope.

1. In a well at Runcu, where the working barrel had a length of some 8¼ feet, a stroke of some 7¼ feet was set up, i. e. practically the whole length of the barrel. Consequently at the top of the stroke the piston was not sufficiently straight, i. e. showed a tendency to wobble, and the rope immediately above the working barrel beat against the walls of the tubes; in this manner a metal dust was rubbed off from the tubes, which fell into the pump and upset the functioning of the piston.

This is a case of incorrect installation. There was no necessity for such a long stroke. If it was a question of getting more liquid out of the well, all that was needed was to increase the speed of working.

2. A very common mistake in employing a pump rope is not to immediately shorten the rope after the elongation that takes place during the first few days of work.

Although a modern pump rope is constructed to give a minimum of elongation, nevertheless, at the commencement of work there will be some stretch, and it is therefore very important that, during the first two or three days of working the rope, there should be someone on duty day and night to watch for elongation and to immediately adjust the rope.

In a well at Moreni, where a pump rope was installed, this measure was not taken. Of course, during the first night the rope elongated somewhat, and consequently began to flap free in the well, without working the piston; as a result during the night sand crept in. In the morning the man in charge did the usual thing—tugged hard at the rope and broke it.

Of course the piston was eventually extracted and the rope spliced.

But a rope which had been strained in this manner, i. e., beyond the limit of elasticity, is of not much use for further work.

Now, this could have been easily avoided. If only the precaution mentioned above had been taken, there would have been no breakage of the rope or interruption of work.

3. Another cause of difficulty is the absence of sufficient weight at the end of the rope.

For this purpose the correct procedure is to attach three heavy sinker bars to the lower end of the rope. There was a case recently in a well at Chiciura where the tubes were so crooked that the sinker bars would not pass down, and an attempt was made to pump with a few sucker rods attached to the end of the rope.

However, the rope was not held taut, and therefore at every stroke the rope was subjected to a shock. As there were some 3000 such shocks a day, the process known as slow-fracture was set up in the rope, which eventually became so brittle that it continually broke.

4. Another trouble of pumping is defective socketing.

In many wells the strain on the rope is so small that even defective socketing does not make any difference.

But there are cases, e. g. where the level of the liquid is high or where there is a lot of sand to set up friction on the piston, when good socketing is indispensable.

I have met cases when on socketing the cable the strands have been simply bent back without any separation of the individual wires, and then molten metal poured in.

It must be borne in mind that the lubrication of a rope during manufacture is a very important factor. Under good ropemaking practice oil is introduced around the wires at every process. This is of paramount importance, as once the cable is made, the introduction of oil between the individual wires is a very difficult matter.

However, it should also be borne in mind that as long as there is any oil on the wires, the molten metal will not adhere to the wires. For this reason, one will find in standard instructions for rope socketing that emphasis is laid on the necessity of thoroughly cleaning the individual wires with benzine and then drying them with muriatic acid.

Apart from this question, if the wires that go to make up the strands are not separated, the molten metal cannot enter in between them and the adhesion between the outer wires of the strands and the metal will not be sufficient to hold the rope firmly in the socket under great tension.

Another important point is that the metal used for filling the socket should have as low a melting point as possible. For that purpose it is preferable to use zinc, which has a melting point of about 415° C.

It should be borne in mind that the first critical moment of steel is somewhere around 700° C. and any near approach to this temperature is going to produce a change in the structure of the wire.

All leading wire rope manufacturers supply detailed instructions for socketing, and, if these instructions are accurately carried out, the rope will never break in the socket; on the contrary that will be the strongest part of the rope, there being in addition to the rope itself, the strength of the socket and the metal in the same.

5. In another well at Runcu, a rope was attached to a chain running over the balancing beam, but the chain had a certain amount of lateral play. Consequently, the rope was at times bent sideways both against the metal groove in

(*Please turn to page 33*)

Table Showing Financial Advantages of Wire Rope for Oil Well Pumping

	Rods	Wire Rope	Economy
1.) Initial cost.	5/8" Rods cost approximately 50 c per metre in Roumania.	A veriform-Fix rope (as manufactured by the Anglia Company) of the standard diam. of 16 m/m. costs about 30 cents per metre. For shallower wells it is practicable to use a thinner rope of about 13 or 14 m/m. which increases the economy considerably.	Say, 30%
2). Operation.	A gang of men work several hours to raise or lower the piston.	The pump rope does this in a few minutes without any hand labor.	The economy here varies according to the nature of the well. This work might be required once a week or perhaps only once in two months. But whether or not these gangs of men are raising or lowering the piston all the time when using rods, the petroleum producer has to have them, and, if they are not working on this, they are doing other odd jobs, which may, or may not be of importance. It can be taken as an average that at least some $15-20 per well per month will be saved under this item alone.
3. Speed of work.	With rods it is seldom practicable to work faster than about 20 strokes per minute.	The Veriform-Fix sucker rod line can work at any reasonable speed. Experience has already proved that you can work economically at double the speed of rods.	Providing the oil is there, you can, for instance, turn a 50 barrel well into one of 100 barrels, which even at present prices mean a good many dollars per well per day.
4.) Maintenance of tubing.	Rods consistently damage tubing.	The wire line when properly controlled with rollers, e. g. the Control apparatus, does not touch the tubing even in crooked wells.	It is difficult of course to express such a saving in dollars, but it might well mean a whole string of tubes in the life of a well.
5). Motive power and wear and tear of installation.	Rods weigh on the average 1.75 to 3.5 kgr. per metre.	The standard 16 m/m. Veriform-Fix rope weighs 1 kilo per metre.	This means a saving of from 45% to 70% in motive power. There will naturally be a similar reduction in the wear and tear of the outfit generally. In other words, the total cost of the rope will be paid for out of this economy alone within a few months.
6). Risk of accidents.	Rods snap without warning and occasion fishing jobs with long delays.	A proper pump rope will never break unexpectedly, except as the result of gross negligence.	The Petroleum Producer knows better what a significant saving this may represent.
7). Replacement.	Rods require continual replacement and repair.	The rope never requires repair except for reasons shown in clause 6, whilst the life of the pump rope has not yet been ascertained. Ropes that have been working for over a year are still in perfect condition.	The saving here it is difficult to transfer into percentage, but it must be enormous.

Measures of Die Performance

By J. R. Longwell
Engineer, Carboloy Company, Detroit, Michigan

Many Variable Factors Enter Into Wire Drawing Costs. The Factors to be Considered in Estimating Die Costs Per Ton on a Basis Fair to the Wire Drawer and the Wire Producer are Outlined Here. ▼ ▼ ▼

DIE performance as measured in the wire drawing mills today is not on a standard basis which will allow the various mills to compare their efficiency. The variables entering into the measure of die performance are many and it will be possible to prepare comparable data only when clearly defined standards have been fixed which are recognized by industry.

The consumer orders his wire to definite specifications which are recognized by all. The physical strength and size can be measured exactly. The chemist can accurately determine the percentage of each element. With these data the mill and the customer can both be sure that the specifications have been met.

Now consider the die manufacturer and the die purchaser. What standards are available which will allow the purchaser to order a die and then inspect the product he receives? What assurance does the die manufacturer have that his product will be satisfactory when he has no specifications to meet?

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IS the wire drawing industry actually obtaining the most economical performance from its cemented carbide dies? Is the die manufacturer supplying the best cemented carbide die in shape, material and mounting? What should the die manufacturer do to better his product for application in all mills?

These are some of the questions that can be asked and for which an answer should be ready, but is it? What basis is to be used in answering these questions?

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DIE performance, it seems to us, should be measured by considering three major items: first, tonnage produced within standard limits; second, quality of the finished product; third, production per machine man. Let us analyze each of these items, and see just what we must face in reaching some common methods of measurement.

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THE tonnage produced within standard limits is dependent upon a number of factors which cannot be overlooked. These factors will bear close observation. There is a wide variation in the limits allowed in various mills at any given size. One mill will allow plus .002 and minus .002 or a total of .004" in the size of the wire drawn through a die at a given size while another mill will only allow half this limit. In the first mill the tonnage is greater for the die size but the variation in limits makes it impossible to compare results on the tonnage basis alone.

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THE methods used in picking up and crediting tonnages drawn through any one die vary so much that the accuracy of the figures is sometimes high or low as much as ten percent. This item must then be considered in standardizing or comparing die performance.

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THE great variation in the material drawn at any one or range of sizes is an important factor in picking up die performance records. We recently visited one mill where the chemical and physicals of the rod from lot to lot were uniform. In this mill the rod was free from oxide inclusions and had only small overlaps and overfills. The diameter of the rod was also within plus or minus .010. Here the tonnage drawn through the cemented carbide dies was high. Five dies had produced three hundred tons of wire with a die wear of .001 per 99 tons of wire drawn. Within a very short distance we visited another mill where they were drawing what was stated to be the same wire but their tonnage drawn per .001 die wear was only 25. Two of the dies from the first mill were transferred to the second mill but the tons drawn per .001 die wear did not increase in the second mill.

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IT is a known fact that cleaning, rusting, liming and baking have a great deal to do with the life of any cemented carbide die and yet we find nearly as many methods employed as mills visited. Each mill thinks that their method is best. What is to guide us in determining whether the methods used on these operations do not materially affect die performance? Only recently we were in a mill where they were having trouble with slivers and wire breaking not only on cemented carbide dies but also on chilled iron dies. The source of this trouble was traced to poor preparation of the rod. Do the mill records, as kept today, allow accurate appraisal of die performance by crediting the die life with the tonnage lost due to poor rod preparation?

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THE number of drafts taken in reducing the rod to any gauge of wire has some bearing on die

performance. How are we to compare records obtained while three holing 12½ ga. with those obtained in a mill where four holing 12½ ga. is standard practice. We have seen it clearly demonstrated that the die performance when four holing 12½ go. was almost twice as great as that obtained when only three dies were used.

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SPEED of drawing plays a large part in the die performance and must be carefully considered. We recently saw figures obtained on a run of several weeks duration where .70 carbon tire bead wire was being drawn on single blocks. During this run the finishers at .035 drew an average of six tons each and were still reported as on size. The dies were transferred to a continuous machine finishing at about twice the speed in feet per minute. The dies cut out in four hundred pounds. This only emphasises the necessity of considering speed of drawing when die performance is being studied.

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THE age old question of lubrication is still with us and by some wire mill superintendents is considered paramount. We were discussing this point with the superintendent of a copper mill a few weeks ago and he showed us some figures at .063. His cemented carbide dies had averaged slightly over 30 tons at this size. The wire size not varying more than ½ of 1%. A week or so later we were in another copper mill using rod from the same source that supplied the first mill, the same make of machine and the same make of dies. The first mill made their own lubricant while the second mill purchased their wire drawing compound. The second mill was obtaining only ten tons per .063 die within limits of ½ of 1%. Was this die performance low because of dies alone?

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THE care given the cemented carbide dies is as great a determining factor in die performance as any of the above. With chilled iron and steel dies an average of one bundle per hole is good. In many mills they thread only one bundle to a hole. Hence no care is necessary. What care is necessary when cemented carbide dies are used?

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THIS varies with material drawn and mill conditions. The mills getting economical die performance are taking care of their dies. We have seen many mills where no effort is being made to obtain good die performance by caring for the dies. The dies are simply handed out to the wire drawer until the die is off size. In such mills the die records are not nearly as good as those obtained elsewhere. You cannot compare such records and expect to determine any facts.

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IT is true, that the personnel of the mills is fast dwindling as a factor in die performance but nevertheless it is still a factor which must be taken into consideration. We have seen one wire drawer throw out the dies as no good and the man next to him put the dies to work and have no more trouble than he was having with chilled iron dies. How is this question going to be judged when comparisons are made with the idea of obtaining facts? There are still a few mills where the name stamped on the die makes the die a good one to the exclusion of all others. These are few; but a few still do exist.

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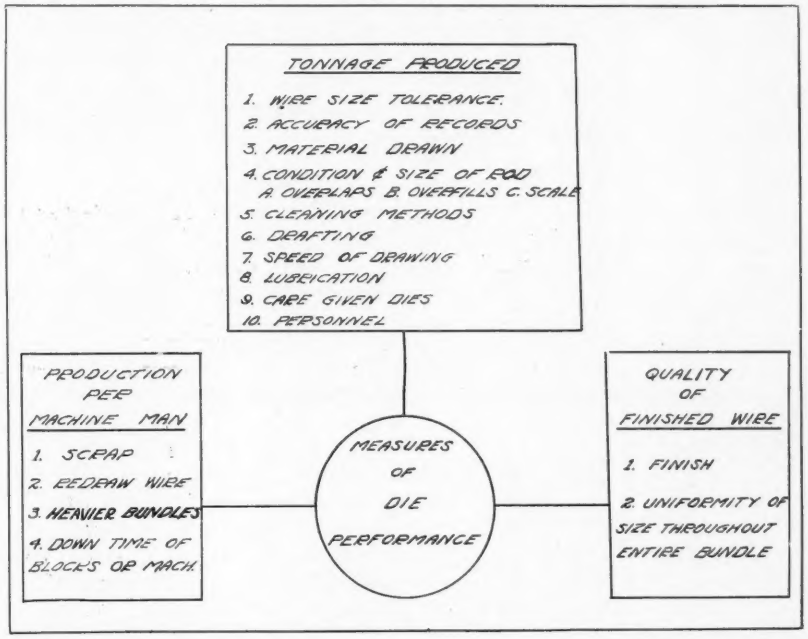
THE quality of the finished product is one which is always uppermost in the minds of the mill men. Better the quality of the finished product and your competitors are handicapped. The dies are closely connected with quality and it is necessary to consider quality of product when comparing die performance records obtained in various mills.



THE finish obtained through a cemented carbide die is far superior to the finish previously obtained. Then there are some finishes obtained today that cannot be obtained with chilled iron or steel dies. Isn't this a matter of die performance? What standard of finish was obtained on the wire produced through the dies being compared.

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GREATER lengths of wire which is round and the same size at both ends of the bundle or spool, are obtained through cemented carbide dies. These greater lengths allow the mills to reduce their handling and machine down time expense. This saving is a matter of die performance.

(*Please turn to page 24*)

Development of the Tungsten Carbide Die

By L. C. Jacobson

Union Wire Die Corp., New York, N. Y.

An Outline of the Difficulties Surmounted in the Development of the Carbide Die from its Inception to its Present Use in Drawing Special Shapes. ▲▲

THE Tungsten Carbide die has come into its own. In three years it has advanced from obscurity until today it is a full fledged member of the wire industry.

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FOR years the wire industry had sought a material which would remove the uncertainty caused by die failure; a die which would permit the drawing of larger bundles, and which would also enable the employment of less highly skilled labor and further a die that could be easily reworked by die men now employed in the industry. In answer to this hope the Tungsten Carbide die first made its appearance. While it was greeted with some skepticism, there was an undercurrent of cooperative optimism on the part of the industry. If this new material could do what its sponsors claimed, the industry wanted to know it; but, in a sense, it naturally was from Missouri. It was up to the die manufacturers to make good their claims, and the efforts and discouragements of these men have written a brilliant page of dogged determination and quiet systematic research. If it had not been for the very helpful spirit pervading the entire wire field, it is doubtful if that within so short a space as three years that the Tungsten Carbide die could have reached even a portion of the success which it is now enjoying. Wire mill superintendents, foremen, die men, metallurgists and purchasing agents, all have in some measure contributed its developments.

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IN order to get a proper picture, it might not be unwise to consider the original claims for the Tungsten Carbide die. In 1928 it was said that the cemented Tungsten Carbide developed by the Krupp Company, for use in wire drawing, was economically, more efficient and superior to any material from which dies had ever been made. Morris Simons foresaw the problems facing the introduction of a new die material when he said: "If we do a steady, deliberate and careful job, keeping in mind the tremendous scope of the wire industry, realizing the volume of historical data which has been accumulated for our guidance, and making use of the various theories and practices, we shall be successful." Unless we approach this die development with open minds we shall fail." The three years since this statement was made have demonstrated its soundness.

TODAY, there are only two mills in the United States and Canada that do not use some Tungsten Carbide dies. Four of the largest mills are completely equipped.

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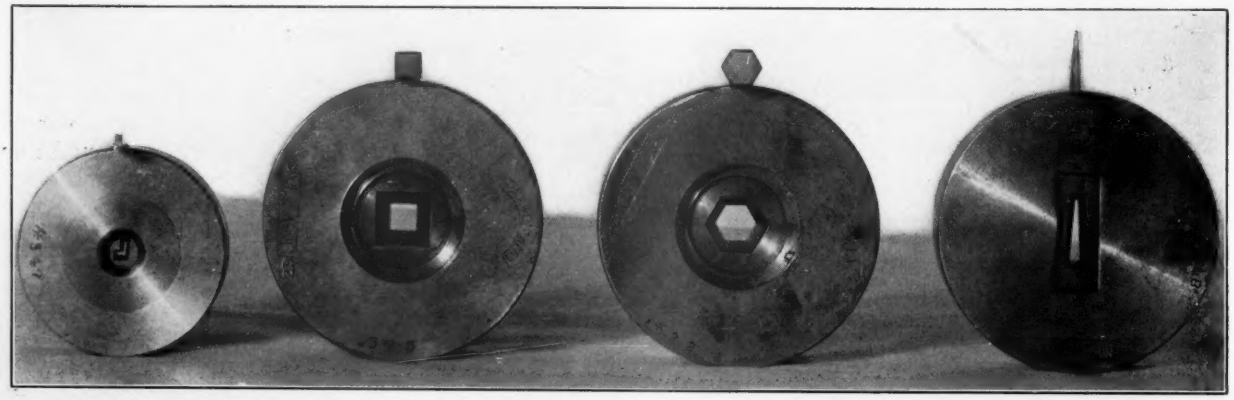
THE Tungsten Carbide die promised to do three things:
Produce better drawing products.
Increase the efficiency of the labor unit.
Reduce Costs.
In three years it has accomplished its promises.

✦ ✦ ✦

IN order to be more explicit, let us consider each item separately. Today the buyers of wire, bars and tubes are increasingly fussy about appearance and size. Take for example spoke wire. It must "shine like a nigger's heel", or as in some instances, it must be particularly dull. It must be free from all surface imperfections. One buyer however, requires that the surface be roughened and entirely without lubricant in order that the paint to be applied may more easily adhere. We are not considering the inherent physicals of the wire because this is something not entirely within the function of the die. The varying specifications for one class of work are given only to demonstrate the seemingly outlandish and uncalled

(*Please turn to page 26*)



UnWida Dies Used For Drawing Special Shapes.

✦ ✦ ✦ ✦ ✦ ✦ ✦ ✦ ✦ ✦ ✦ ✦ ✦

Outstanding Personalities of the Wire Industry

Photo by Schervee-Worcester

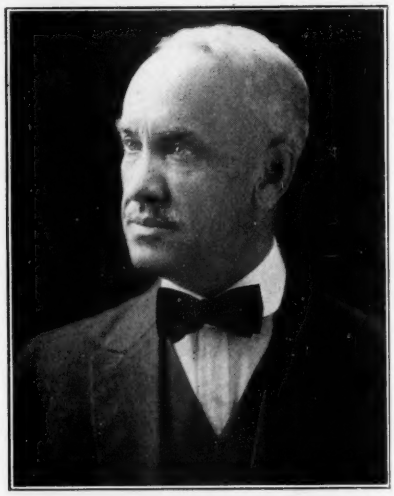
FRANK H. SLEEPER

Frank H. Sleeper, president of Sleeper & Hartley, Inc., of Worcester, Mass., internationally-known designers and builders of spring coiling and wire drawing machinery, has designed and built over 500 successful machines. The patents in his own name form an imposing array, especially so when the diversity of endeavor is considered.

Born and educated in Canada, he there established his first business where he is credited with building the first self-starting single-phase alternating current motor in the Dominion in 1891. Many other electrical improvements followed in rapid succession but did not engage his entire attention for engine lathes, drills, punches, shears, paper cutters, and a noted lifting jack were produced under his direction.

He came to Worcester in 1907 as engineer of the Morgan Spring Co., setting up his own business in that city in 1911, where wire forming, spring making and wire drawing machines have been produced for the past 20 years. Outstanding in this list are the continuous wire drawing machines, silent no-gear nail machines, Universal spring coilers, and armoring machines for "BX", hose, rope, wires, and cables.

Although retired from active business for the past two years, Mr. Sleeper's inventive genius has not been dormant and among other things he has designed and built an elevator and a novel drive and transmission for his speed boat, both of which are in daily use at his summer home in Canada. He makes his winter home in St. Petersburg, Fla.



WALTER COOLIDGE STONE

FOLLOWING an illness of several weeks Mr. Walter Coolidge Stone passed away on November 7th at Rochester, Minn., where he had undergone an operation.

A record of Mr. Stone's life for the past thirty-five years closely parallels the history of the wire business during that same period.

He was born in 1863 at Lawrence, Massachusetts. When very young his family moved to Cleveland, Ohio, where he received his education in the public schools and spent the early years of his manhood. For a time he served as a salesman for the Bingham & Company of Cleveland. Prior to the formation of the American Steel & Wire Company, he was associated with the late Mr. Frank Baackes who was then engaged in the operation of the Salem, Ohio plant. With the launching of the larger corporation he became active in the production end of the business and served with the pioneers of the Wire Company. During the "Gates regime" the name of Walter Stone was well known in the realms of wire production.

During his years of service with the A. S. & W. Co., which continued until 1917 he served as Superintendent of the Finley and Salem, Ohio plants and later at New Castle and Rankin, Pennsylvania. From the latter position he was promoted to the Assistant Managership of the Chicago District, being associated in that capacity with the late Mr. Fred C. Gedge.

✦ ✦ ✦

ON January 1, 1917 he severed his connection with the Wire Company to accept the position of operating head of the Wire Division of the Interstate Iron and Steel Company at their Grand Crossing Plant, which position he held up to the time of his death.

Besides his widow and two daughters, Mr. Stone is survived by a brother, Arthur L. and two sisters, Miss Ellis F. Stone and Mrs. Henry Thompson, all of Cleveland.

Although the span of his life closely approached the proverbial "three score years and ten" he was until his late illness remarkably well preserved. He continued in active management of his plant until stricken by the malady which brought an end to an exceptionably serviceable and exemplary career.

At the interment which took place at Lakeview Cemetery, Cleveland, his memory was honored by the attendance of members of the Executive Board of the American Steel and Wire Company and others who had been associated with him from time to time in the business to which the greater part of his life was devoted.

A Review of Recent Wire Patents

No. 1,830,449, CONTINUOUS WIRE SUPPLY SYSTEM, Patented Nov. 3, 1931, by George G. Swank, of Crawfordsville, Indiana.

The inventor provides a coiled wire supply system for continuous feeding of wire to machines such as wire fence making machines and other wire producing machines, so that there will not be any necessity of stopping the machines to rewire. A trucked stem is provided and adapted to support one or more coils of wire having their ends welded together to form an endless strand and an arrangement permitting the coils of wire carried by one stem to be connected with the coils of wire supported by the second stem whereby upon emptying of the wire from one stem the feed is continued from the second stem.

✦ ✦ ✦

No. 1,829,974, COATED WIRE NAIL, Patented Nov. 3, 1931, by George N. Williams of Kokomo, Indiana, Assignor to Continental Steel Corporation, of Kokomo, Indiana, a Corporation of Indiana

The invention covers a wire nail, covered with a coating of zinc spelter and that covered with a coating of a gummy-like substance, commonly known as a cement coating, which latter coating becomes softened while the nail is being driven and hardens again when the friction ceases.

✦ ✦ ✦

No. 1,831,526, PORTABLE WINDER, Patented Nov. 10, 1931, by Charles D. Dallas, of Chicago, Illinois, Assignor to Revere Copper & Brass Incorporated, of Rome, New York, a Corporation of Maryland.

While particularly adapted in winding sheets of metal into coils, this device could be employed as a wire winder.

✦ ✦ ✦

No. 1,831,750, WIRE MEASURING DEVICE, Patented Nov. 10, 1931, by Valentine J. Phillips, of Johnstown, Pennsylvania.

Particularly, this device is adapted to measure electric wire and conductor strands, and to be used in a warehouse, storeroom or the like.

✦ ✦ ✦

No. 1,832,149, METHOD OF ASSEMBLING BED AND CUSHION SPRINGS, Patented Nov. 17, 1931, by George A. Stackhouse of Oakland, California, Assigner to L. A. Young Spring & Wire Corporation, of Detroit, Michigan.

The method of assembling these helically coiled springs with a base unit and a central tie unit, comprising crossed wires, consists in initially engaging the bottom coils of the springs with the crossed wires of the center tie unit, rotating the springs by means of a driven chuck to bring their lower ends into position to be secured to the base unit, and securing to the base unit.

Complete Descriptions and Drawings of Patents May Be Had for 25 cents. Address, Wire & Wire Products, 551 Fifth Avenue, New York.

No. 1,831,908, FENCE WIRE FABRIC, Patented Nov. 17, 1931, by Hoah S. Harter, of Waukegan, Illinois.

The construction is such that a substantially triangular shaped mesh is produced, for the purpose of lessening deformation under strain lengthwise of the fabric.

✦ ✦ ✦

No. 1,832,455, SUBMARINE SIGNALING CONDUCTOR, Patented Nov. 17, 1931, by John J. Gilbert, of Douglaston, New York, Assignor to Bell Telephone Laboratories, Incorporated, of New York, N. Y., a Corporation of New York.

A submarine signalling cable constructed according to this invention has a central conductor continuously loaded with tapes of magnetic material, insulation surrounding the conductor, a teredo tape surrounding the insulation, a return conductor external to the tape, with the tape having a direction of lay opposite to that of the loading tapes.

✦ ✦ ✦

No. 1,833,444, CHAIN WELDING MACHINE, Patented Nov. 24, 1931, by Earl A. Stuller, of Cleveland, Ohio, Assignor to The Cleveland Chain & Manufacturing Company, of Cleveland, Ohio, a Corporation of Ohio.

The mechanism includes a pair of blocks, carrying electrodes adapted to be advanced into position engaging the chain link at the cut or to be retracted from the chain link to permit lifting and advance of the chain, the blocks being pivoted and the device containing means to hold the ends of the chain being welded. There is also a burr-removing mechanism connected with the device.

✦ ✦ ✦

No. 1,833,798, OIL FILLED LEAD COVERED ELECTRIC CABLE, Patented Nov. 24, 1931, by George B. Shanklin, of Schenectady, New York, Assignor to General Electric Company, a Corporation of New York.

The inventor provides a corrugated metal strip wound about the cable insulation, the strip forming circumferentially extending grooves connected to each other by longitudinally extending passages, for the oil.

✦ ✦ ✦

No. 1,833,260, WIRE FABRIC, Patented Nov. 24, 1931, by Edward F. Pink, of Cambridge, Maryland.

This is described as an improvement over the patentee's prior U. S. Patent No. 1,735,788, dated Nov. 12, 1929, and the object of the disclosure in invention is to produce a very flexible wire fabric and one where the interstices are very small.

No. 1,833,588, WIRE TENSION DEVICE, Patented Nov. 24, 1931, by Robert C. Pierce, of Niles, Michigan, Assignor to National Standard Company, of Niles, Michigan, a Corporation of Michigan.

This invention covers a device particularly adapted for tensioning a plurality of wires as they are fed to a weaving or braiding machine, as for instance a machine for weaving and braiding wire tapes in the making of reinforcing elements for tire beads. The device prevents one wire from being fed faster than the others.

✦ ✦ ✦

No. 1,833,761, RESISTANCE GRID, Patented Nov. 24, 1931, by Emil Stranszey, of Warren, Pennsylvania.

In this construction the major portion of the weft wires are formed of resistance wire, and reinforcing bars are provided which extend parallel to the weft wires and act to make the grid rigid in the direction of the weft.

✦ ✦ ✦

No. 1,829,773, CONVEYOR BELT, Patented Nov. 3, 1931, by Francis N. Woodman, of Clinton, Massachusetts.

This particular belt is made up of a number of metal plates hinged together with a wire lacing, the same being made up of a pair of spiral wire coils, interlaced with each other.

✦ ✦ ✦

No. 1,830,592, HONEYCOMB FOUNDATION, Patented Nov. 3, 1931, by George D. C. Coddington, of West Middletown, Ohio.

Woven diamond mesh wire forms a portion of this foundation adapted to be mounted in frames and suspended in bee-hives.

✦ ✦ ✦

No. 1,830,883, ROAD CHAIR, Patented Nov. 10, 1931, by Howard W. Nester, of Worcester, Massachusetts, Assignor to Parker Wire Goods Company, of Worcester, Massachusetts, a Corporation of Massachusetts.

This relates to a heavy wire device for spacing and supporting the reenforcing rods used in cement construction and particularly in the construction of cement or concrete roads. In this particular construction a double superposed series of rods are spaced and supported.

✦ ✦ ✦

No. 1,830,792, SHAKER SIEVE AND METHOD FOR PRODUCING THE SAME, Patented Nov. 10, 1931 by Rudolf Herrmann, of Dresden, Germany.

The process or method comprises in providing warp wires and weft wires of soft steel material and at certain intervals replacing the soft steel wires (weft) with a stronger steel wire and fastening the stronger steel wires to a framing device.

Exports and Imports of Wire

Exports of iron and steel wire products in September and October, 1931
(In gross tons)

	October 1931	September 1931	October 1931
Wire rods	1,621	2,675	1,637
Hoops, bands and strip steel	1,891	1,098	1,916
Plain black or galvanized iron or steel wire	1,221	835	2,227
Barbed wire and woven wire fencing	1,134	1,005	2,901
Woven wire screen cloth	54	55	73
Wire rope	189	211	266
Insulated iron or steel wire and cable	35	6	36
Other wire and manufactures	273	672	669
Wire nails	934	340	733
Tacks	50	37	35
Other nails including staples	237	234	412
Bolts, machine screws, nuts, rivets and washers	328	272	645
Total, these 12 classifications	7,967	7,440	11,550

Imports of iron and steel wire and wire products into the United States
(In gross tons)

Concrete reinforcement and other bars	8,872	8,374	2,393
Wire rods	250	593	496
Barbed wire	513	404	428
Round iron and steel wire	140	138	158
Telephone and telegraph wire	14		11
Flat wire and strip steel	64	74	47
Wire rope and strand	197	177	196
Other wire	42	21	32
Hoops and bands	3,106	2,857	2,444
Nails, tacks and staples	604	446	578
Bolts, nuts and rivets	67	57	13
Total, these 11 classifications	13,869	13,141	6,796

Exports of iron and steel products from the United States in October totaled 59,335 gross tons and imports 29,401 tons, the former thus recording a drop of 10,433 tons from the preceding month and the latter a reduction of 1,565 tons.

With two exceptions the increases registered were in small amount—a 3,512 ton gain in scrap and again of 1,653 tons in steel bars alone being noteworthy. Among the instances of reduced shipments were those in wire rods, 1,054 tons. Japan bought 10,801 tons of scrap, 2,227 tons of tin plate, and 1,146 tons of wire rods.

Of the 5,680 tons exported to the United Kingdom, 1,843 tons was steel bars.

Exports of iron and steel wood screws rose in volume to 597,018 gross valued at $72,990, while those of brass wood screws dropped off to only 11,010 gross valued at $3,753.

Belgium continued its role of chief supplier, being accredited with 12,608 tons of the 29,401 tons total import. Chief among the items that made up the Belgian total were 3,759 tons of merchant steel bars, 2,773 tons of concrete reinforcement bars, and 1,376 tons of hoops and bands.

The German total of 4,996 tons —made up in large part of shapes, 907 tons; merchant steel bars, 751 tons; and hoops, 660 tons—exceeded by a narrow margin the French total of 4,304 tons—a figure which included 2,029 tons of shapes and 999 tons and hoops and bands.

Card clothing imports, 10,835 square feet valued at $19,310—were smaller; the United Kingdom was the chief source of supply with 9,749 square feet ($9,681), followed by Germany with 781 square feet ($1,485) and France with 165 square feet ($669).

Wire cloth and screening imports amounted to only 25,335 square feet in October, 8,830 square feet coming from Germany, 7,987 square feet from France, 5,318 square feet from Canada, and 3,200 square feet from Czechoslovakia.

Fourdrinier and other papermaking wire imports amounted to 73,555 square feet, Germany supplied 32,982 square feet, France

(*Please turn to page 28*)

Wire and Rod Welding

Better — Faster — at Less Cost

MICROMETER PRECISION MICRO-WELD TRADE MARK

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Various Models With Capacities From No. 20 wire to ⅝" Rods— For All Metals—

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Wire Drawing Soaps for Low or High Carbon Wire

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OAK SUPER

For copper and non-ferrous wet or dry
Can also be used for bright finished steel wire.

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A good Inhibitor pays for its cost in the Saving in Acid and Metal.

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Born and raised in the Steel Industry.

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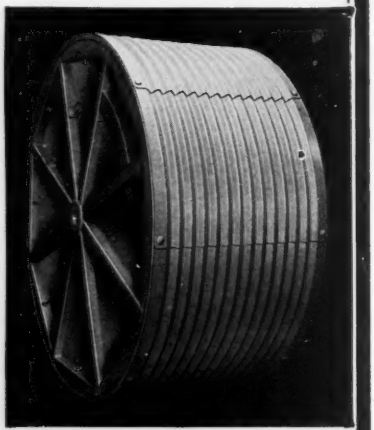
"Red Head"

Steel reels



Manufactured and sold by

R. B. HAYWARD COMPANY

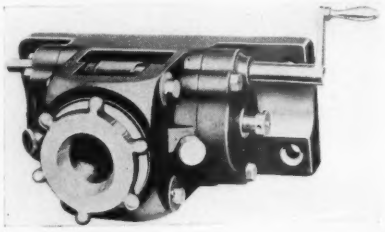
1714-1736 Sheffield Ave., Chicago

Under license arrangement with Electrical Research Products, Inc. Subsidiary of Western Electric Company, Incorporated.

New Wire Machinery

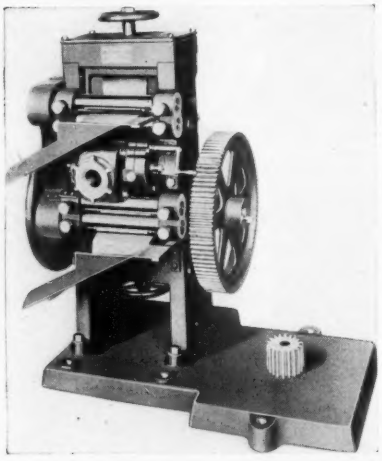
Lead Stripping Machine

THE most interesting feature of the improved Lead Stripping Machine illustrated here is the adjustable guide and splitting head, which is suitable for all diameters of lead covering within the range of the machine.



Adjustable Guide and Splitting Head. ✦ ✦

Electrical wire and cable manufacturers, who produce round cables for the most part, occasionally have the problem of removing the lead from an oval or dluplex cable. This is easily taken care of by the adjustable guide and splitting head on this stripping machine, which has two separate adjustments to take care of the large and small diameters of oval cables.



Lead Stripping Machine. ✦ ✦ ✦ ✦

Furthermore, an easily accessible and quick adjustment is provided for the depth of the lead splitting knives. These features are equally important to manufacturers of rubber garden hose, who are using the lead encasing process, because adjustments for different diameters of hose can be made in a few seconds and the expensive and cumbersome guide bushings are not required. This is a product of John Robertson Co., Inc., of Brooklyn, N. Y.

Brazing Machines for Electric Wire

The Midwestern Tool Company, 2811 North Ashland Avenue, Chicago, Illinois, have been licensed by the Electrical Research Products, Inc., as sole manufacturers of electrical wire brazing machines and electrical insulation stripping machines under the Western Electric Patents.

These machines were formerly made by the Teletype Corporation, (Morkrum-Kleinschmidt) and all repair parts for machines made by them will be supplied by the Midwestern Tool Company.

Electrical Wire Brazers

THE great economy of these machines lies in the ease, speed, and simplicity of operation and principally in the great strength of the splice.

The ends of the wire to be brazed are placed in the clamp jaws, bent, and butted together to form an arch, thereby closing the transformer secondary circuit. The primary of the transformer is then closed by pressing the push button and the transformer then supplies the correct current for heating the juncture to brazing temperature. The flux is applied first, then the silver wire solder completing the spice.

These machines come in several different sizes and models with capacities ranging from 8 to 20 gauge wire.

Electrical Insulation Stripper

IT is claimed that this machine is the only one of its kind and strips by burning two grooves in the insulation down to the conductor—these grooves are completed by a twist of the wrist and the pull removes the insulation cleanly and

quickly, leaving an even edge.

The removed insulation drops into a pan under the top of the bench and the fumes are removed by the exhaust system.

The action is extremely simple and speedy and the capacity is from 6000 to 12000 per day depending upon the cord to be stripped.

A slight pressure on the foot pedal and a twist of the wrist and the wire is cleanly stripped.

Both hands are free for handling and stripping.

The pair of electrically heated stellite jaws or blades remove the insulation quickly and cleanly without nicking or breaking the strands of the conductor.

It will handle cotton, silk or rubber covered conductors and is the only machine made that will remove the braid from tinsel conductors without harming the thread core of the tinsel.

The rectangularly shaped heads move horizontally toward each other when the foot pedal is depressed.

The electrically heated blades or burning elements are wired in series and are slotted for quick and easy removal when replacement is necessary.

The movement of the blades is adjusted for the thickness of the insulation on the conductor—the movement being just sufficient to burn through the insulation without harming the conductor itself.

The circuit of the Rheostat is then closed and the current adjusted for the desired amount of heat which is reached when the blades are heated to a cherry red.

This machine is a product of the Midwestern Tool Co., 2811 No. Ashland Ave., Chicago, Ill.

✦ ✦ ✦

The Union Wire Die Corporation of New York have appointed the Syndicat Industriel Le Commerce Exterieur, 33 Boulevard Hausman, Paris, France, as their exclusive agents for the sale of their dies throughout Europe with the exception of England.

This company is one of the most prominent concerns in the technical field in Europe and advise that their Paris shop is now operating to capacity on the production of Widia dies.

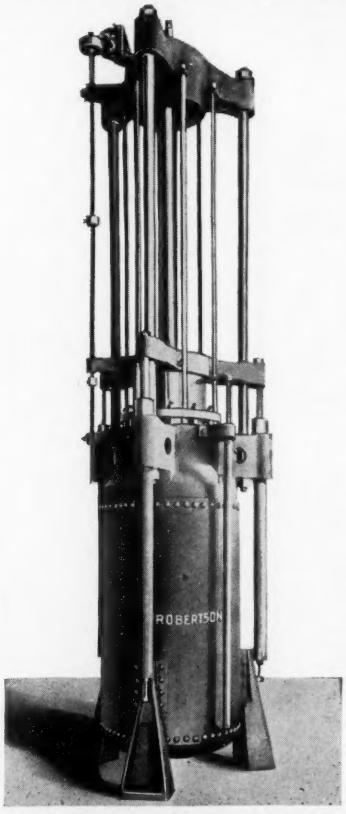
THIS ACCUMULATOR
requires Low Air Pressure

The John Robertson hydro-pneumatic Accumulator requires the low air pressure of only 175 lbs. Resting upon its air tank as a base, this Accumulator may be placed upon an ordinary floor, needing no heavy foundation, occupying a minimum floor space . . .

Sizes 96 gals. at 1500 lbs. to 2½ gals. at 6000 lbs. hydraulic pressure, all having bronze bushed hydraulic cylinder, limit switch, and tell-tale rod; and a by-pass vent in the hydraulic ram guards against possible failure of the limit switch.

An auxiliary air compressor with automatic control maintains air pressure in the air cylinder and storage tank, **Send for Details.**

NOTE: Robertson makes all types of lead-encasing machinery used by electrical cable and lead-covered wire manufacturers. Robertson lead encasing equipment is virtually standard here and abroad. ***Write us.***



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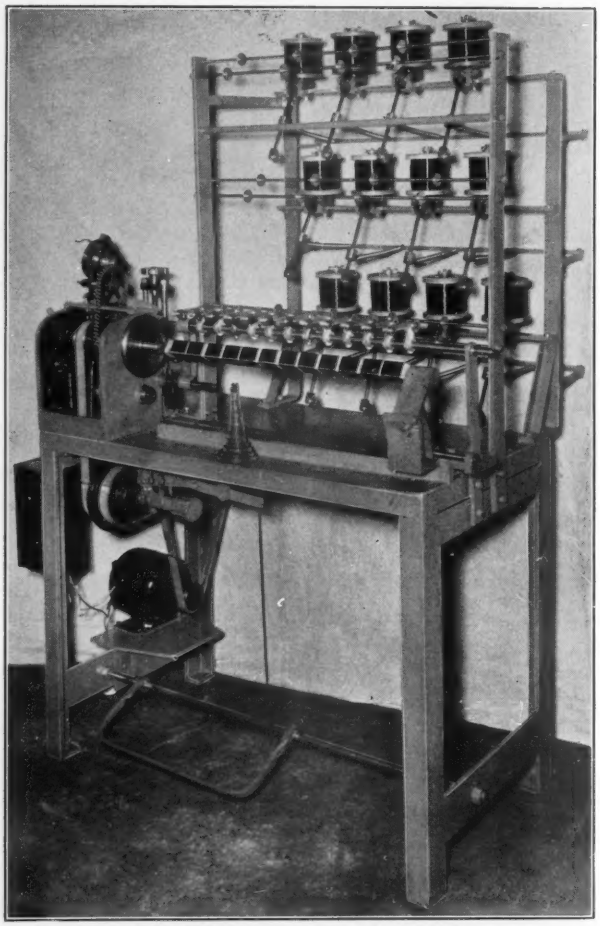

MULTIPLE COIL WINDER
WITH AUTOMATIC STOP COUNTER

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Chain Draw Benches—Multiple Coil Winders.
Flat Wire Rolling Mills—Rod Pointers.
Hollow Wire Straighteners and Equipment.
Multiple Strand Bright Annealing Units.
Stranders to Customers' Specifications.
Reelers and Spoolers for all sizes of Wire and Cable.
Reelers and Spoolers for Tinning, Galvanizing, Patenting and Annealing.

Frederick M. Conran

Designer and Builder of Special Machinery

107 Colden St., Newark, N. J.

Die Performance

(*Continued from page 17*)

THERE is the factor of uniform weight per given length and conversely more length per given weight. This is of prime importance where resistance of the wire is a determining factor and is likewise a source of saving to the buyer of wire whose product is based on length. Allowance should be made here when a fair comparison is made of actual die performance.

✦ ✦ ✦

THE third major factor of die performance is the production of wire per machine man. Here we must make allowance for the increase in tonnage drawn due to less down time of the machines caused by die changing. The decrease in the tonnage of wire produced which had to be reworked or scrapped is a direct saving effected by the cemented carbide die and one which is important when considering die performance.

✦ ✦ ✦

DIE performance when fairly considered is a matter for careful study and records reported as obtained in one mill may not be as good as those of other mills but until all the facts are assembled no conclusion is possible. How then are we to obtain true drawing costs on which to compare the performance of cemented carbide dies with the performance of chilled iron or steel dies? Certainly all of the factors outlined in the foregoing must be considered and there are probable other factors not mentioned that in all fairness should be considered when die performance costs are up for discussion.

✦ ✦ ✦

WE are firmly convinced, after talking with many mill men, that the cemented carbide dies are economical to use when all of the factors enumerated have been considered and the best possible application of the dies has been made. In view of the foregoing we hesitate to give any records of tonnages obtained knowing that all the facts cannot be given. However, in order that some definite

figures may be had for further discussion we append figures showing tonnages obtained through cemented carbide dies in representative mills.

Material Drawn:—.08-.10C Basic open hearth

Rod—Average size—.216; 20 min. rust, limed, 8 hr. bake

Die Shape: — Approach—16° included angle
Length of land—2/3 die diam.
Corner at junction of land and approach not broken.

Lubricant:—Wire drawing grease on ripper—Soap powder on subsequent dies.

Speed of Drawing: — Continuous finishing @ 670 ft. per min.

Die Size	Gage	Wire Drawn Per .001 Die Wear	
		Pounds	Feet
.169	7½	111,400	1,460,000
.135	10	55,640	1,140,000
.111	11¾	29,260	887,000
.0925	13	15,300	668,000
.0765	14½	6,375	

Single Hole:—Ripping rod with an average diameter of .235 at 540 ft. per min.

.191	6	247,147	2,523,167

Material Drawn: — .60-.70C. Spring wire patented at size .170.

Die Shape:—Approach 12° included angle
Length of land—2/3 die diam.
Corner at junction of land and approach was not broken.

Lubricant:—Soap powder on first hole—subsequent holes dry.

Speed of Finishing:

Die Size	Gage	Wire Drawn Per .001 Die Wear	
		Pounds	Feet
.146	9¼	11,950	724,000
.127	10½	37,500	2,960,000
.104	12	23,244	2,760,000
.085	13½	25,810	4,550,000
.071	15	17,970	4,480,000

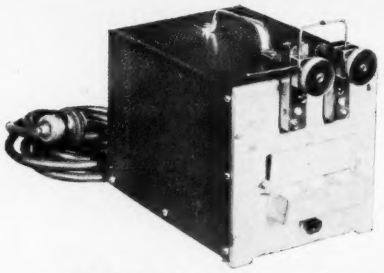
The following data is an average of figures obtained from four different mills each drawing at a different speed and on different makes of machines:

Material Drawn:—Copper

Rod:—Average size—.260

Die Shape:—Approach—16° included angle
Length of land ½ die diameter
Corner at junction of land and approach not broken

(*Please turn to page 28*)



Electrical Wire Brazing and Stripping Machines

Model M-131 Portable Brazer

Photograph at right shows girl operator stripping—a slight pressure on foot pedal and a twist of the wrist and the wire is cleanly stripped.

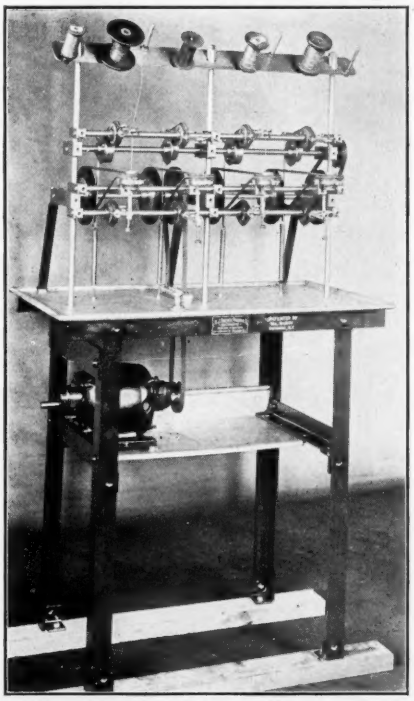
SEND FOR CIRCULAR W-30

Manufactured under Western Electric Patents by

Midwestern Tool Co.

Manufacturers of Special Machinery and Tools, Cutters, Dies, etc.
2811 North Ashland Avenue
CHICAGO, ILL.—U. S. A.

The Haddow Die Re-Cutting and Polishing Machine will lower your die re-cutting cost to a fraction of present costs



Why do you continue to pay a die cutter and pay for diamond dust to remove a large percentage of your diamond from your dies? Diamond that has done no work—when, by the use of the Haddow Die Recutting Machine you may use practically all your diamonds to draw wire, especially in the small sizes.

ONE MONTH'S SHOP PRODUCTION

Total number of dies cut —1047

Total number of hours required—182.5

Average number of dies per hour—5.73

Number of operators—1

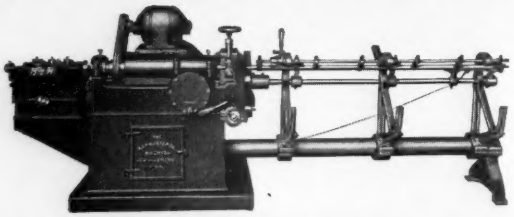
With only one man—This machine will do the work now requiring four to six men in less time and at lower cost.

4 HEAD MACHINE—Also Made in 6-Head size (With 2 Heads for Heavier Dies).

WILLIAM HADDOW
17 Eastern Ave.
Ossining, N. Y.

Your Wire Straightening and Cutting Department Needs

SHUSTER WIRE STRAIGHTENING & CUTTING MACHINES



They straighten absolutely true, and each length cut is an exact duplicate of the one before it. Steel Fliers, Timken Roller Bearings, V belt drives, up to date in every way. Easy to adjust and operate.

May we send Catalogue W ?

The F. B. Shuster Company, New Haven, Conn.

Straightener Specialists Since 1866

Metal Spools for Wire Drawing

Metal Spools for Annealing

Metal Bound Spools for Shipping

Metal Bound Reels for Shipping

Hubbard Spool Co.

1620-32 Carroll Avenue

Chicago

Development of Tungsten Carbide Dies

(*Continued from page 18*)

for requirements on the part of the trade, but inasmuch as we must have business we accept the conditions imposed by the purchaser. Some screw stock must have a special velvety greyish finish, while others must have a mahogany finish and when delivered must look as the name implies and so on down the line. These same buyers, influenced by the fact that we have been passing through a buyers market have cut the allowable tolerances to the bone, and woe betide the wire manufacturer who thinks the good old days have not passed. The wire mill superintendent has sought to produce on steel and chilled iron dies the kind of material wanted by the purchaser. As his efforts to meet the specifications have increased, his rejections have increased. These rejects are no fault of his. With the tools at his hand and available, it has been practically impossible to meet the growing trade specifications. Then came the Tungsten Carbide die, and with it came finish and size, without which even if the steel were perfect the shipment would not be accepted. And so in the beginning whenever the wire manufacturer had a tough job he turned to this type of die.

✦ ✦ ✦

HAVING found something which would produce the required finish and satisfied himself that insofar as the original claim to produce a better finished product was substantiated, the mill superintendent turned to increasing the output of his labor unit. With the chilled iron and steel dies, the uncertainty of die life was the one unsurmountable obstacle which retarded progress in this direction. Rods had become better, they could be made to almost any desirable length and weight. Machinery could be manufactured which promised to increase the efficiency of labor, but die life was a stumbling block. The size of bundle was limited to the number of feet which could be drawn before the dies became oversize.

With the Tungsten Carbide die the uncertainty of die life now became the one fixed factor, all others such as bundle size, speed and labor per ton becoming the variables. In two screen wire mills which are Tungsten Carbide die equipped, which employ continuous intermediate dry and continuous fine wet machines, the use of Tungsten Carbide dies has caused an increase of 35% in labor efficiency. This has been accomplished without the introduction of any other labor saving device. Later perhaps, newer machinery, better lubricants and better rods may increase the labor output, but this increased production will center inextricably around die life. In an industry of so many variables, the Tungsten Carbide die rears as a rock of fixed values from which many other progressive steps will have to receive support.

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EVEN where continuous machinery has not been employed, the production per unit of labor has been increased. There are many reasons why this could take place. The wire drawer has been saved numerous journeys to the die room. His entire time has been taken up in the making of good wire. He has made practically no scrap. At the end of each bundle he does not need to move his plate into a new position and by this he saves a matter of some seconds, but during the course of a day many minutes are saved. Of course it will be contended that such savings are infinitesimal and too small to be considered, but exhaustive tests conducted in mills completely equipped, show an 8% increase in finished output per unit of labor. Eight percent increased production of a wire mill is money in anybody's pocket.

Perhaps the most important accomplishment is the reduction of general all round costs which the Tungsten Carbide die has effected.

Lessened scrap, better wire and all good wire, increased unit efficiency—all result from the use of Tungsten Carbide dies.

✦ ✦ ✦

THE introduction of any new thing is generally accompanied by some mistakes in policy. Per-

HUDSON WIRE CO.
Successors Royle & Akin
Fine Wire Manufacturers
OSSINING Established 1902 NEW YORK

Manufacturers of Fine Bare Wires

Copper Wire Specially Processed for Enameling Purposes

Copper	Lead
High Brass	Zinc
Low Brass	Commercial Bronze
Pure Tin	Phosphor Bronze
Cadmium	Silver Plated Copper
Bronze, Various Grades	False Gold

10%, 18%, 30% Nickel Silver

LAHN
False Gold Copper Silver Plated Copper

BRUSH WIRES CRIMP and STRAIGHT

Brass	Copper
Steel	Nickel Silver
	Phosphor Bronze

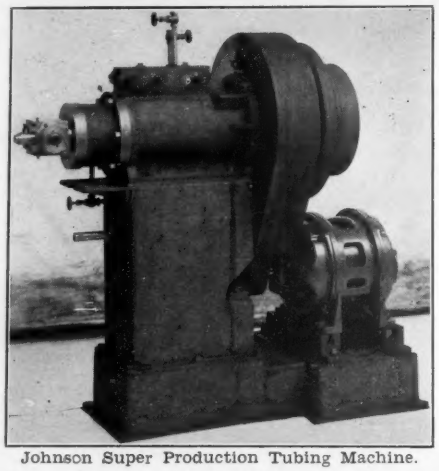
Metallic Fibre for Packing Purposes

BRAND
"B"
Wire Drawing Soap Powder
Made from high titre Palm Oil stock for high carbon drawing.
Proven by test to lower costs and improve efficiency.
Manufactured exclusively for wire drawing by

THE J. T. ROBERTSON CO., INC.
SYRACUSE, N. Y.
Wire drawing soap specialists since 1893.

STEELSKIN
REG. U. S. PAT. OFFICE
For High or Low Carbon Wire
WIRE DRAWING SOAPS
Established 25 years.
R. H. MILLER CO., Inc. Homer, N. Y.

Johnson Super Production Tubing Machine



Johnson Super Production Tubing Machine.

Performance always reflects the true measure of merit, and the Johnson Super Production Tubing and Straining Machine is demonstrating daily by performance.

First: That at present its production speed is only limited by panning and reeling efficiency, which obviously assures production equal at least to panning or reeling maximum limits, but the Super Panner is not far off.

Second: That burning of compound is reduced, not increased.

Third: The production cost reducing elements of the machine insure unfailing measures of necessary fortification against excessive production costs.

Bulletins tell both the outside and inside working of the machine, and will be sent on request with all other information required to cover your requirements.

CORONE WIRE INSULATORS, INC.
PUTNAM, CONN.

Sil-Fos Brazing Alloy
U.S. PATENT 1,829,903

A *Discovery so important to brazers of non-ferrous metals and wire products that you should write for a copy of our Bulletin No. 51-WW.

**Contains SILVER, yet is sold by the pound, in strips, rods or pulverized, at lower prices than you would think possible.*

HANDY & HARMAN
57 William St., New York

haps the most flagrant mistake was that of blanket guarantee which was promulgated solely to give the wire manufacturer the confidence which it was felt he should have in the firms with which he contemplated doing business. The die manufacturer has absorbed many failures which were no fault of the die itself, but which were in many instances due to poor cleaning, rods that were in terrible condition as regards to finish and shapelessness, but this has been one of the penalties of introduction.

The user of Tungsten Carbide dies has come to know now that the deliberate and painstaking cooperation he has given the die manufacturer has not been wasted. The die manufacturer has learned that he will be successful only in direct ratio to the amount of actual mill experience his field men have had, the lessons they have learned well, and the jobs they have undertaken and successfully completed.

Die Performance

(*Continued from page 25*)

Lubricant:—Wet —Different mixture used in each mill

Speeds of Drawing:—Finishing at 800, 1200, 1500 and 2000 feet per min.

Size	Gage	Pounds	Feet
.064	14	63,411	5,341,000
.072	13	103,537	6,600,000
.081	12	106,037	5,360,000
.091	11	112,159	4,500,000
.102	10	173,409	5,510,000
.120	8½	181,433	4,050,000
.144	7	350,850	5,560,000
.175	5½	300,567	3,585,000
.204	4	156,815	1,240,000

Pounds drawn per .001 die wear is not available because of the variation tolerances allowed in the mills.

Exports and Imports

(*Continued from page 21*)

15,278 square feet, Sweden 13,007 square feet, Austria 10,831 square feet, and Denmark 1,457 square feet.

Imports of wire fencing and netting were again smaller in October—that galvanized before weaving totaling only 631,325 square feet—(541,325 square feet from Germany and 90,000 square feet from the Netherlands); that galvanized after weaving totaled 1,791,230 square feet. (978,900 square feet from the Netherlands, 675,000 square feet from Belgium, and 137,300 square feet from Germany).

Wire-heddle receipts rose sharply to 2,377,000 pieces—1,320,000 from France, 390,000 from Germany, 334,000 from Switzerland, and 333,000 from Belgium.

Wood-screw imports totaled 19,310 gross valued at $2,099—16,690 gross ($1,933) from Sweden and 2,620 gross ($166) from Germany.

The Union Wire Die Corp. of New York announces that they have established connections in Chicago and are now in a position to give service to the trade in that territory on Un-Widia dies. Mr. W. D. Bronson represents this company in Chicago. His address is 6724 Stoney Island Ave., telephone, Fairfax 7100, and is prepared to give prompt attention to all requests for information.

History of Wire Industry

(*Continued from page 11*)

due to larger bundles. Total power cost, including both rod and wire mill, would be greater, but a big labor saving could be picked up in the rod mill where the same crew rolling a double section would turn out double the normal tonnage. A net saving of $1.00 to $1.50 a ton might be expected of the consolidated rod and wire mill practice. Number five might continue to be rolled for small gauges of wire.

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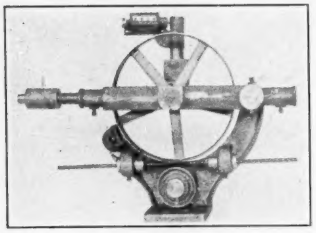
The Cleaning House

WE will probably see changes in the cleaning house. Sulphuric acid is a poor thing, its only recommendation being its cheapness. We are trying to remove iron oxide from steel by a re-agent that does not act on the oxide but which does destroy the steel. The inhibitors are doing good work in the cleaning house. They appear to let the acid work on the rich oxide lying next to the surface of the steel but at the same time greatly retard its action on the metal. Electrolitic cleaning is by no means out of the picture. It may surprise us at any moment. I have assumed, of course, that rods would continue to come to us covered with scale. We may find a practical way to cool rods in a neutral atmosphere, and eliminate scale. We may find ourselves dealing with iron that has never felt heat. Iron can be electro-deposited from an acid solution of the ore. Right now there is a large plant producing seamless tubes by electro-deposition onto a rotating mandrel. It is not hard to picture a fine wire, say No. 40 gauge, passing back and forth over rollers in a plating bath and being built up into a No. 5 rod. For that matter, why No. 5 rod? Why not build up the gauge desired, and use the wire drawing process only to get a new core of fine wire to start another cycle? These things sound fantastic, but we must remember that there are countries with large ore deposits, abundant water power, and no coal.

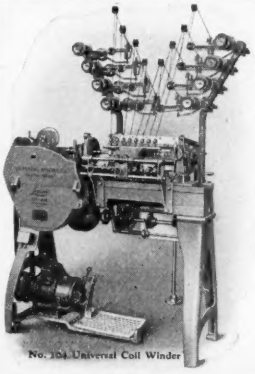


IMPROVED
Wire Measuring Machine

For measuring bare and insulated wire.
The new patented double grip model gives you more correct measurements.
You save the difference.
Eight different types will measure the finest wire up to and including 3-inch cable.
All equipped with "VISIBLE" counters.

Manufactured by
HOPE NARROW FABRIC CO.
68 Althea St., Providence, R. I.
Builders of Improved Braiding Equipment for more than 25 Years.

ROCKWELL
FURNACES
ELECTRIC *and* FUEL
For Ferrous and Non-Ferrous Wire Products
Complete heating equipment for strand annealing, billet heating and intermediate operations.
Bright annealing furnaces for ferrous and non-ferrous metals.
"Furnace and Fuel to Suit Conditions"
ELECTRICITY—GAS—OIL—COAL
W. S. ROCKWELL COMPANY
Industrial Heating Equipment
1885-1 50 Church Street (Hudson Terminal Building) New York


No. 104 Universal Coil Winder

An interesting development for more efficiently producing paper-insulated coils. Paper is injected automatically without attention from the operator. Fully adjustable for a wide range of coil and wire sizes.

Six other machine types complete a line of coil winders answering any possible manufacturing need.

Catalog is available on request.

UNIVERSAL WINDING COMPANY
BOSTON
LEESONA

WIRE DRAWING
Machinery and Equipment
Rod Frames—16" Frames
8" Frames—Take-Up Frames
Wire Pointers—Puller Tongs
General Castings for Wire Mill Use
Circulars on Request.
E. J. SCUDDER FOUNDRY & MACHINE CO.
TRENTON N. J.

WIRE BRAIDING MACHINES

SINGLE, DOUBLE or TRIPLE DECK
VERTICAL or HORIZONTAL TYPE

NEW ENGLAND BUTT COMPANY

Office and Factory
304 Pearl St., Providence R. I.

Western Office
20 North Wacker Drive, Chicago, Ill.

We build a complete line of Stranding Machines, Cabling Machines, Closing Machines, Rubber Strip Covering Machines, Measuring Machines and Other Allied Machines for the Wire Trade.

OUR WIRE MACHINERY CATALOGUE SENT ON REQUEST

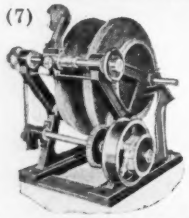
RUESCH

SPECIAL MACHINERY DESIGNED AND BUILT FOR WIRE, TUBE AND BRASS MILLS

H. J. RUESCH MACHINE CO.
409 MULBERRY ST. NEWARK, N. J.

MANUFACTURERS OF MAGNET-WIRE ENAMELING MACHINES, COTTON, SILK, ASBESTOS, PAPER AND OTHER TAPE, WIRE INSULATING MACHINES

(7)



REELING STANDS With TRAVERSE for reels 30-in., 36-in., 41-in., 60-in. and 72-in. diameter.

Complete Wire Tinning and Wire Electro-Plating Outfits. Wire Saturating Equipment.

Wire-Respooling, Coiling and Wire-Reclaiming Machines.

Automobile-Cable and Pressure-Hose Armoring Machines.

"Aimco" Panning Machines, Vulcanizing Pans and Patch-Vulcanizers for Rubber Covered Wire.

Pull-Out Capstans, Reel-Stands and Steel Reels.

EST. 1855 Aimco INC. 1915
"American" INSULATING MACHINERY COMPANY
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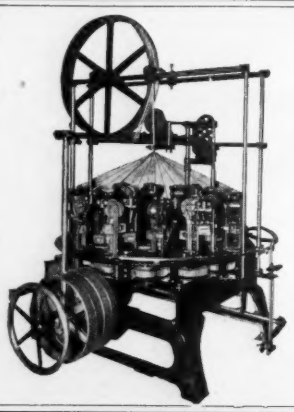
517 Huntingdon St.
Philadelphia, Pa., U. S. A.

SPECIAL MACHINES DESIGNED OR BUILT



WIRE BRAIDERS

Multiple Head Wire Covering Braiders

Single, Double or Triple Deck Wire Covering Braiders

Single, Double or Triple Deck Cable Braiders

FIDELITY MACHINE COMPANY

Philadelphia, Pa.

THE lime coat is not necessarily the last word, although it is hard to foresee anything cheaper and more effective. We must remember however, that it is only a carrier for lubricant and we may fine some lubricant that will not need a carrier.

Baking

BAKING is a process which, historically speaking, is in its infancy. We started sixty or seventy years ago with open fires in the chamber with the rods. Then we built a separate firebox and ran hot flues through the baker. Then we vented the baker to get a circulation through the wire bundles. We have acknowledged by these developments that the essential is a movement of hot air through the rods. The next logical step is the introduction into the baking chamber of air preheated elsewhere at better economy. This is actually coming over the horizon now. There is some evidence that steady supply of preheated air may permit satisfactory baking at lower temperatures. The purpose of baking is to drive out occluded hydrogen and to roughen the surface of the lime by driving off its water quickly. If we ever stop using mineral acids and lime, we will stop baking.

Lubricants

THE matter of lubricants seems at first glance to be in good shape but take another look at it. Most of the rejections in the wire mill are due to failure of lubricant. The lubricating coat is established in the first draft and if it is not perfect there is no hope for the wire. What we need is a lubricant which the wire will pick at each draft as it picks up the copper coat used in the European mills. Such a lubricant would cut our rejections to 1/20 of 1%.

Dies

DIES are in good shape. Tungsten carbide is getting along nicely and there is now no limit

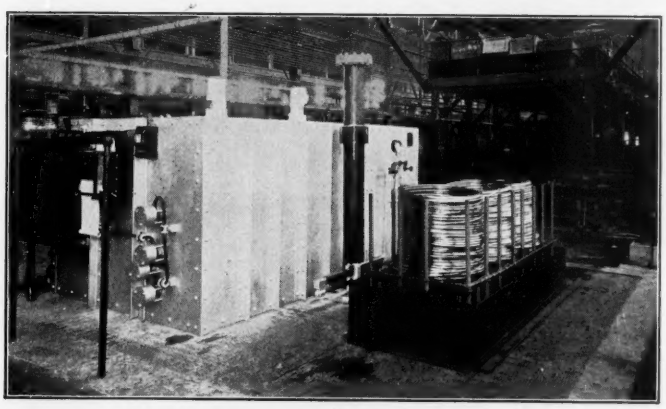
imposed by dies on the amount of wire which can be drawn in one threading. You will all remember the early days of the tungsten filament lamp which was so delicate that it would break if you looked at it too hard. The tungsten filament is today the toughest thing that the electric light industry has ever developed. There is no reason to doubt that the tungsten carbide now used in dies and now offering such varied results, is susceptible to the same degree of improvement. Tempered steel dies have been worked out successfully by all who have seriously applied themselves to the job. Chilled iron dies are a good deal better than is generally supposed and when they get a decent break they will push any rival very hard. I expect that within a very few years, dies will be so far in advance of other details of the wire making process that the die makers will have to sit down and wait for us to catch up with them. There is a crying need right now for a successful method of analyzing the forces operating in the die, separating die pull into its component parts, namely, die friction and deforming force. Logical theories must be formulated and checked, and formulas derived, from which we can plan experiments on lines where success will count most. Much work has been done and continues to be done in this direction. What we need now is success.

Galvanizing

GALVANIZING has some distance to go yet. It is not a satisfactory process. The success still depends too much on personnel. Personal experience counts too much and technical data too little. While it is nominally a continuous process, the exhaustion, testing and renewal of the acid, flux and spelter baths are periodic, and results are far from uniform. Zinc bonds beautifully with iron if you get it hot enough but unfortunately it bonds with the kettle as well as with the wire. I predict

WE WISH YOU A

HAPPY NEW YEAR



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ONE OF OUR WAYS OF CONTRIBUTING
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BALLOFFET

1870 — 1932

The Quality Diamond Dies

Balloffet Diamond Wire Dies Co., Inc.

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DIAMOND DIES

When purchasing
Diamond Dies
avail yourself of the
forty years' experience
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Drawing
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VIANNEY

DIAMOND
DIES

100 FIFTH AVE · NEW YORK

that we shall live to see a revolution in galvanizing. For a guess, I should say it would be along the line of getting the wire into the spelter cleaner and hotter and arranging in some way to have the wire hotter than the spelter and the spelter hotter than the kettle. At the present it is completely reversed.

THERE is going to be a good deal more attention paid to the wire mill as a problem in handling material. Big bundles have begun to force this development and it is a good thing. The cost of converting rods to wire consists of about 15% material including acid, lime and lubricants, about 15% power and about 70% handling. This includes, of course, the wire drawing labor which, when you analyze it, is nothing but handling. Savings made in handling in the wire room by increasing unit weight can be duplicated over and over in the finishing departments, for in every finishing operation on wire, the output per man is largely, if not

The Waterbury Wire Die Co.

Diamond, Composition
and
CHILLED IRON DIES
Waterbury, Conn.

wholly, limited by the frequency of servicing operations which tie right back to the wire bundle as a unit.

✦ ✦ ✦

IN conclusion I want to suggest that if these improvements in wire mill practice are coming, they will come through our efforts. We ought not to sit waiting for them but go out and meet them. If we all stop thinking of the future, our business, relative to that of our competitors would go on about as before. I mean by that our competitors inside the industry; but what I want to emphasize is that our most dangerous competitors are outside the industry. I refer to such competition as that of veneer crates, pasteboard cartons, permanent molds for concrete construction, and the other factors which have recently taken the wire nail for a ride. They are the forces we must fight and we fight them them most effectively when we stand shoulder to shoulder with our competitors inside the industry.

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Wire Rope For Oil Well Pumping

(*Continued from page 14*)

the beam, and the top of the tubing. This served to fracture the rope and eventually it broke at that spot.

This was again a breakage which arose from defective installation and should never have happened.

NOW we come to the question as to what particularities there are in connection with the installation of the wire line for pumping.

1. There must be a proper rope socket at the end of the line. This is important, and this rope socket should have a swivel. Good rope sockets are sold by all the leading oil well supply houses.

2. Beyond the socket and above the piston there should be three heavy sinker bars.

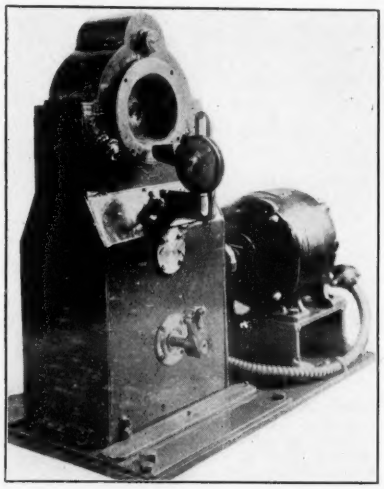
3. As regards the pump itself, this should be of a type in which the piston is loose fitting.

4. Above the well the rope is attached to a clamp fixed to the working beam, and from that it is wound round a drum stationed at the back of the well.

(*Please turn to page 34*)

New Die Lapping Machine

The Elevator Supplies Company, Inc., of 1515 Willow Ave., Hoboken, N. J., are introducing a new die lapping machine. This machine was developed by the General Electric Company in their wire drawing mills at Schenectady, N. Y. and the Elevator Supplies Company have acquired all manufacturing sales rights for the United States and Canada.



This machine is unique in that it is individually motor driven and can be equipped with either a quill or a lapping wire, and when the wire is used, it can be sent through the die at the proper angles to lap out the entrance angle, the approach and relieve the corners.

As the machines are individually driven, any number of them can be mounted on a bench or floor stand, and an installation can be added at any time. The machine is built with either a cast iron case and base plated, weight 150 pounds,. The process of operation in a case of a badly scored die is to start in with a quill after taking out rings and then finishing up with a wire, completing the job by hand.

✦ ✦ ✦

The final article on Automatic Combustion Control System for Wire Furnaces will appear in the February number of Wire and Wire Products.

LEADERS

of the Wire and Wire Products industry like the Victoria.

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BUYERS' GUIDE

For more complete information, consult the annual Directory, Index & Buyers' Guide.

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See Furnaces—Various Headings

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Scudder, E. J., Fdry & Machine Co., Trenton, N. J.

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Amer. Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
John Robertson Co., Brooklyn, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

BAKERS
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

BOBBINS
Mossberg Pressed Steel Co., Attleboro, Mass.

BRAIDER CARRIERS
Mossberg Pressed Steel Co., Attleboro, Mass.

CASTINGS—Wire Mill
E. J. Scudder Foundry & Machine Co., Trenton, N. J.

CLEANING & PICKLING EQUIPMENT
Vaughn Machinery Co., Cuyahoga Falls, O.

COILERS—Sheet and Wire
H. J. Ruesch Machine Co., Newark, N. J.

COMPOUNDS—Insulating
Corone Wire Insulators, Inc., Putnam, Conn.

COMPOUNDS—Wire Drawing
Oak Chemical Co. Bechtelsville, Pa.

COPHOLDERS
Mossberg Pressed Steel Corp., Attleboro, Mass.

CRANES—Wire Mill
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

DIES—Chilled Iron
Waterbury Wire Die Co., Waterbury, Ct.

DIES—Composition
Vianney Wire Die Works, New York, N. Y.

DIES—Diamond
Balloffet Diamond Wire Dies Co., Inc., N. Y. C.
Cochaud Wire Die Co., New York.
Driver-Harris Co., Harrison, N. J.
Master Wire Die Corp., New York, N. Y.
Union Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York.
Waterbury Wire Die Co., Waterbury, Ct.

DIES—Lead Extrusion
John Robertson Co., Brooklyn, N. Y.

DIES—Repairs & Re-Cutting
Balloffet Diamond Wire Dies Co., Inc., N. Y. C.
Cochaud Wire Die Corp., New York.
Driver-Harris Co., Harrison, N. J.
William Haddow, Ossining, N. Y.
Vianney Wire Die Wks., N. Y.

DIES—Recutting and Repolishing Machine
Wm. Haddow, Ossining, N. Y.
Vianney Wire Die Works, New York, N. Y.

DIES—Rod and Tube Drawing
Carboloy Co., Inc., Newark, N. J.
Master Wire Die Corp., N. Y.
Union Wire Die Corp., N. Y.
Vianney Wire Die Works, New York, N. Y.

DIES—Tantalum Carbide
Vianney Wire Die Works, New York, N. Y.

DIES—Tungsten Carbide
Carboloy Co., Inc., Newark, N. J.
Driver-Harris Co., Harrison, N. J.
Master Wire Die Corp., New York, N. Y.
Union Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York, N. Y.

DRAW BENCHES—
H. J. Ruesch Machine Co., Newark, N. J.
Scudder, E. J., Fdry & Machine Co., Trenton, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry & Machine Co., Waterbury, Conn.

ELECTRIC WIRE BRAZERS
Midwestern Tool Co., Chicago, Ill.

FURNACES—Annealing
Chas. F. Kenworthy, Inc., Waterbury, Conn.
W. S. Rockwell Co., New York, N. Y.
Surface Combustion Co., Toledo, O.

FURNACES—Automatic
Chas. F. Kenworthy, Inc., Waterbury, Conn.
W. S. Rockwell Co., New York, N. Y.
Surface Combustion Co., Toledo, O.

FURNACES—Bright Annealing
Chas. F. Kenworthy, Inc., Waterbury, Conn.
W. S. Rockwell Co., New York, N. Y.
Surface Combustion Co., Toledo, O.

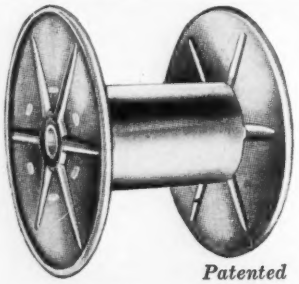
FURNACES—Electric
Chas. F. Kenworthy, Inc., Waterbury, Conn.
W. S. Rockwell Co., New York, N. Y.
Surface Combustion Co., Toledo, O.

FURNACES—Lead Melting
John Robertson Co., Brooklyn, N. Y.

FURNACES—Non-Oxidizing
Chas. F. Kenworthy, Inc., Waterbury, Conn.
W. S. Rockwell Co., New York, N. Y.
Surface Combustion Co., Toledo, O.

FURNACES—Wire
Chas. F. Kenworthy, Inc., Waterbury, Conn.
W. S. Rockwell Co., New York, N. Y.
Surface Combustion Co., Toledo, O.

GALVANIZING ENGINEER
W. H. Spowers, Jr., New York, N. Y.



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MOSSBERG
Pressed Steel Corp.
Attleboro, Mass., U. S. A.
Makers of "Mosspeed" Braider Carriers.

Wire Rope for Oil Well Pumping

(*Continued from page 33*)

5. Should the well be one of those in which production is only intermittent, and it be necessary to close the well down at intervals, it is desirable that, on stopping work, the piston should be raised up as far as possible, as otherwise sand may enter the well and bury the piston.

NOW, let us review from a financial standpoint some of the proved accomplishments of the pump rope up to date. See in tabulated form on page 15.

It is difficult to express in more or less exact figures the saving in production costs when using a pump rope in place of rods.

But a little consideration of the facts indicated in the tabulation will show that the economy must be well over 50%. The Manager of the Consortiul Petrolului Co. after using a pump rope for about a year estimated the economy in working expenditure at about 66-2/3%.

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BUYERS' GUIDE, Continued

INHIBITORS—
Wm. M. Parkin & Co., Pittsburgh, Pa.

INSULATING COMPOUNDS
Corone Wire Insulators, Inc., Putnam, Conn.

INSULATION STRIPPERS
Midwestern Tool Co., Chicago, Ill.

LATHES—Die Reaming
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
The Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

LIME—Pulverized
Amer. Lime & Stone Co., Bellefonte, Pa.

LUBRICANTS—Wire Drawing
R. H. Miller & Co., Homer, N. Y.
Oak Chemical Co., Bechtelsville, Pa.
J. T. Robertson Co., Syracuse, N. Y.

MACHINE—Die Re-cutting and Polishing
Wm. Haddow, Ossining, N. Y.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Braiding
Fidelity Machine Co., Phila., Pa.
Hope Narrow Fabric Co., Providence, R. I.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt. Co., Providence, R. I.

MACHINERY—Brazing Wire
Midwestern Tool Co., Chicago, Ill.

MACHINERY—Bunching
Amer. Insulating Mach'y Co., Phila., Pa.
Haskell-Dawes Machine Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Bundling
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cable, Electric
Fred'k M. Conran, Newark, N. J.
New England Butt Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Company, Paterson, N. J.

MACHINERY—Chain Making
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Closing
Haskell-Dawes Mach. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Paper Insulated Coils
Universal Winding Co., Providence, R. I.

MACHINERY—Coil Winding
Amer. Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Universal Winding Co., Providence, R. I.

MACHINERY—Coiling
Broden Const. Co., Cleveland, O.
Haskell-Dawes Mach. Co., Phila., Pa.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Copper Wire Drawing and Rolling
H. J. Ruesch Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrell Fdry & Machine Co., Waterbury, Conn.

MACHINERY—Cutting
American Insulating Mach'y Co., Phila., Pa.
F. B. Shuster Co., New Haven, Conn.
Sleeper & Hartley, Worcester, Mass.

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.

MACHINERY—Extruding
John Robertson Co., Brooklyn, N. Y.
Schloemann Engineering Co., Pittsburgh, Pa.
Watson Machine Co., Paterson, N. J.

MACHINERY—Flat Wire
Fred'k M. Conran, Newark, N. J.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Forming
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Galvanizing Wire
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Gang Winders
H. J. Ruesch Machine Co., Newark, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Insulating
American Insulating Machinery Co., Phila.
Corone Wire Insulators, Inc., Putnam, Conn.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lead Encasing Presses, etc.
John Robertson Co., Brooklyn, N. Y.

MACHINERY—Lead Stripping
John Robertson Co., Brooklyn, N. Y.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Magnet Wire
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Measuring Wire & Cable
Hope Narrow Fabric Co., Providence, R. I.
New England Butt. Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Panning
American Insulating Machinery Co., Phila.

MACHINERY—Pointing
Fred'k M. Conran, Newark, N. J.
Morgan Construction Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
The Waterbury Farrell Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Rivet
Waterbury-Farrell Fdry & Machine Co.,

MACHINERY—Rod
Fred'k M. Conran, Newark, N. J.
Morgan Const. Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
Schloemann Engineering Co., Pittsburgh, Pa.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrell Fdry & Machine Co., Waterbury, Conn.

MACHINERY—Rubber Strip Covering
American Ins. Mach'y Co., Phila., Pa.
Corone Wire Insulators, Inc., Putnam, Conn.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Rubber Tubing and Straining
Corone Wire Insulators, Inc., Putman, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Screw Wire
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Special
Fred'k M. Conran, Newark, N. J.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry and Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spooling
Fred'k M. Conran, Newark, N. J.
American Insulating Machinery Co., Phila
Hope Narrow Fabric Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Spring Making
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
H. J. Ruesch Machine Co., Newark, N. J.
F. B. Shuster, New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Straightening Hollow Wire
Fred'k M. Conran, Newark, N. J.

MACHINERY—Stranding
American Insulating Mach'y Co., Phila Pa.
Fred'k M. Conran, Newark, N. J.
Haskell-Dawes Machine Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

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The Final Article on Automatic Combustion Control of Wire Furnaces Will Appear in the February Issue of Wire & Wire Products

BUYERS' GUIDE, Continued

MACHINERY—Strip Steel
Broden Const. Co., Cleveland, O.
Fred'k M. Conran, Newark, N. J.
H. J. Ruesch Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Stripping Electric Wire
Midwestern Tool Co., Chicago, Ill.

MACHINERY—Swaging
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Worcester, Mass.
Waterbury-Farrell Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Taping
Amer. Insulating Mach. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Company, Paterson, N. J.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill
Fred'k M. Conran, Newark, N. J.
H. J. Ruesch Machine Co., Newark, N. J.
Schloemann Engineering Company, Pittsburgh, Pa.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrell Fdry. & Machine Co., Waterbury, Conn.

MACHINERY—Welding Wire
Micro Products Co., Peoria, Ill.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Winding
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Universal Winding Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Drawing
American Insulating Machinery Co., Phila.
Broden Const. Co., Cleveland, Ohio.
Fred'k M. Conran, Newark, N. J.
Morgan Construction Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Manufacturing Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury Farrell Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Watson Machine Company, Paterson, N. J.

PACKING—Metallic Fibre
Hudson Wire Co., Ossining, N. Y.

POINTERS—Wire
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

POTS—Lead Melting
John Robertson Co., Brooklyn, N. Y.

PRESSES—Lead Encasing
John Robertson Co., Brooklyn, N. Y.

PRESSES—Lead Extrusion
John Robertson Co., Brooklyn, N. Y.
Schloemann Engineering Company, Pittsburgh, Pa.

PULLERS—Wire
E. J. Scudder Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

PUMPS—Hydraulic
John Robertson Co., Brooklyn, N. Y.

REELS AND SPOOLS—All Kinds
R. B. Hayward Co., Chicago, Ill.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

REEL AND TENSION STAND—
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REEL CRUTCHES
R. B. Hayward Co., Chicago, Ill.
Watson Machine Co., Paterson, N. J.

ROLLING MILLS
Fred'k M. Conran, Newark, N. J.
Morgan Construction Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrell Foundry & Machine Co., Waterbury, Conn.

SOAPS—Wire Drawing
R. H. Miller Co., Homer, N. Y.
J. T. Robertson Co., Syracuse, N. Y.

SOLDER—Silver
Handy & Harman, N. Y.

SPOOLS—Annealing—Detachable Head Handling—Wire Stitching
Mossberg Pressed Steel Corp., Attleboro, Mass.

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TRUCKS
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

TUBE BENDERS AND FORMERS
H. J. Ruesch Machine Co., Newark, N. J.

VULCANIZERS
Watson Machine Co., Paterson, N. J.

VULCANIZING PANS
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.

WIRE—Various Kinds
Hudson Wire Co., Ossining, N. Y.
Jones & Laughlin Steel Corp., Pittsburgh
Seymour Mfg. Co., Seymour, Conn.

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We thought the old machines were pretty good in the old days (and they were) but times have changed. Today we offer not a better method nor a new principle, but—a far better machine that meets in eloquent fashion every demand of the present day—

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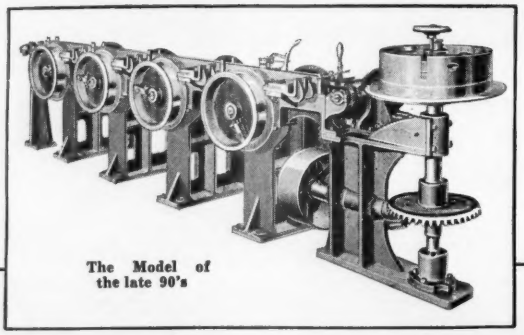
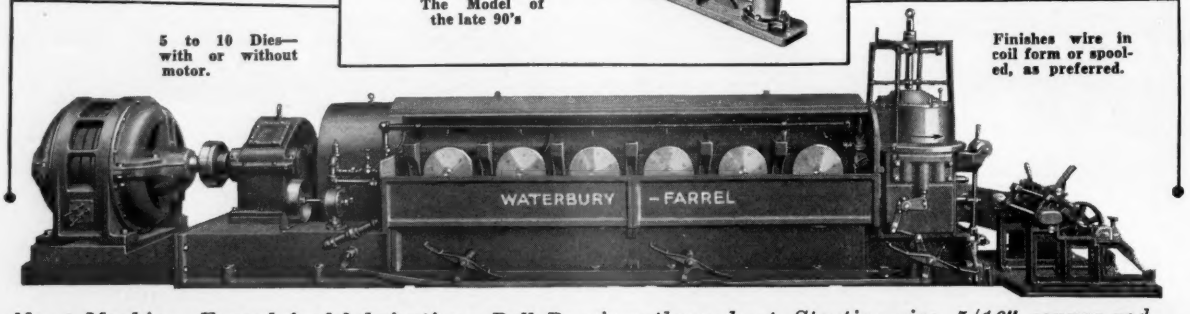


The Model of the late 90's



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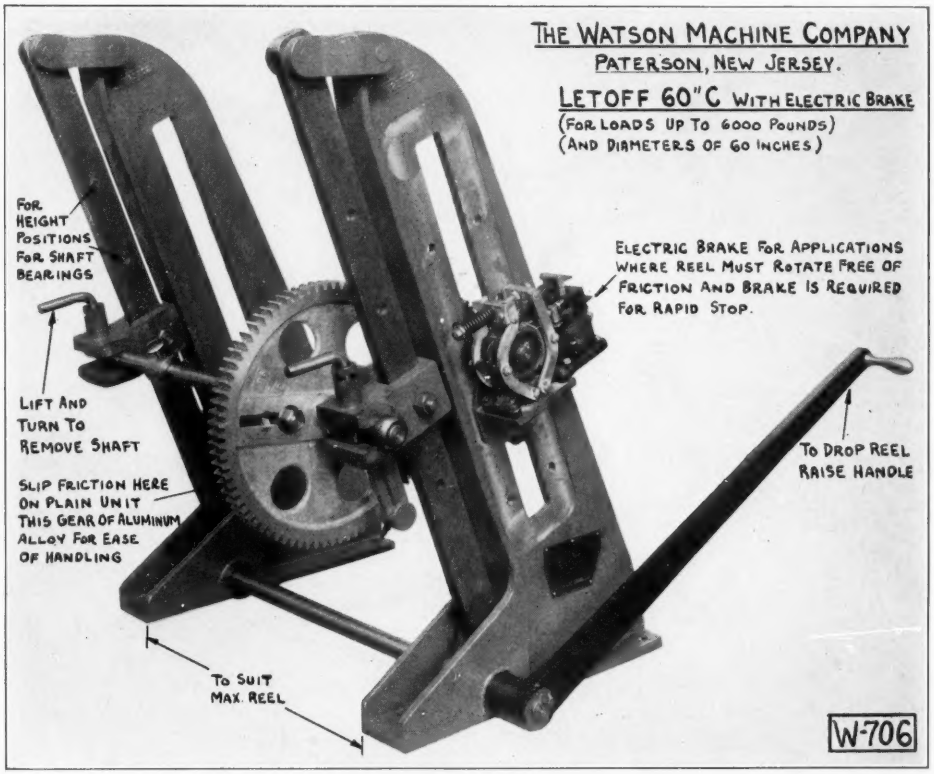
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PATERSON, NEW JERSEY.
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(FOR LOADS UP TO 6000 POUNDS)
(AND DIAMETERS OF 60 INCHES)
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ELECTRIC BRAKE FOR APPLICATIONS WHERE REEL MUST ROTATE FREE OF FRICTION AND BRAKE IS REQUIRED FOR RAPID STOP.
LIFT AND TURN TO REMOVE SHAFT
TO DROP REEL RAISE HANDLE
SLIP FRICTION HERE ON PLAIN UNIT THIS GEAR OF ALUMINUM ALLOY FOR EASE OF HANDLING
TO SUIT MAX. REEL
W-706

The "C" type (shown above) is for heavy reels in three sizes, to pick up reel diameters of 20″ to 42″, 30″ to 60″, and 36″ to 84″. An extremely easy unit to handle and low in cost although built with our usual factors of safety and quality. Ordinarily equipped with plain brake, it is provided with electric brake at extra cost.

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